Changing frontiers

The Peri-Urban Interface Hubli-Dharwad, India

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9 Conclusions

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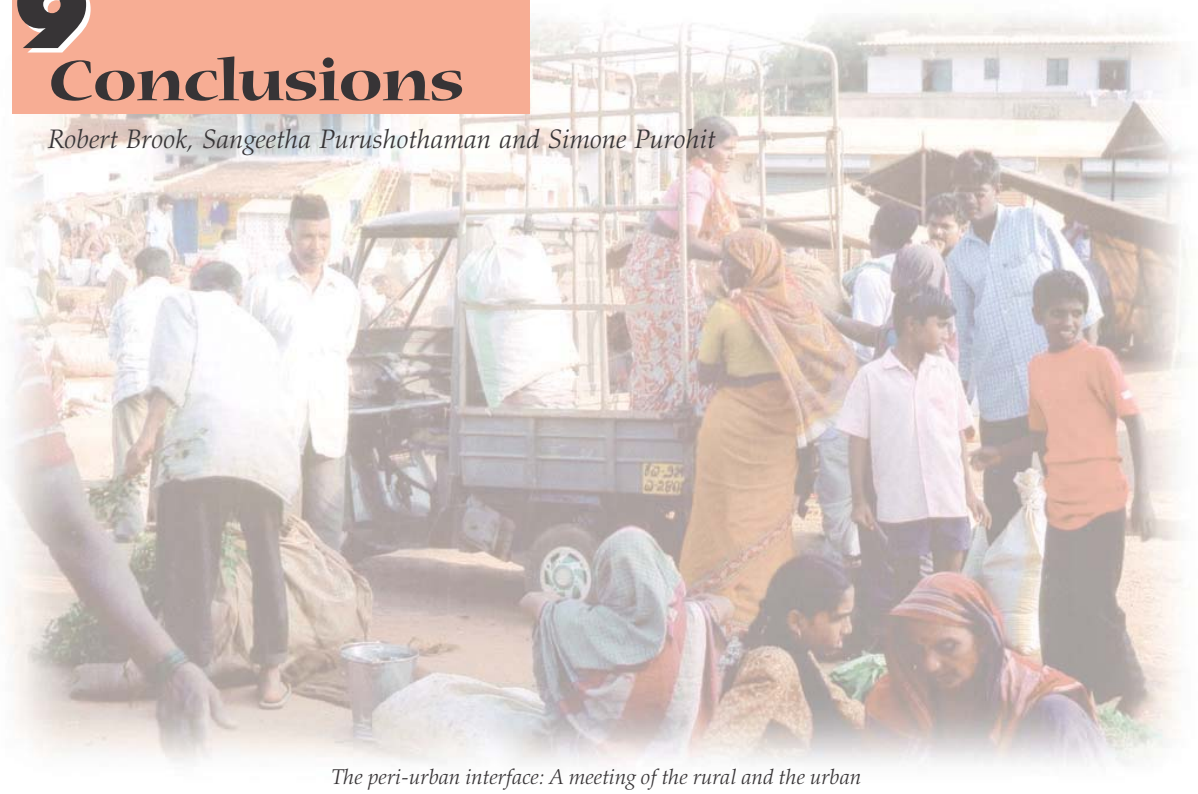


The peri-urban interface: A meeting of the rural and the urban

A great deal of literature, research, policy analysis and implementation exists on either the urban or rural spheres. Where the two meet however is no man's land, where it is most needed for urban and rural institutions to cooperate. Instead what is found is that both sets of institutions tend to neglect the PUI. The PUI thus represents a space crying out for attention. However for policy makers to address the peculiar needs of the PUI, first and foremost is that its specific needs, characteristics, and features should be known and better understood. This book has attempted to bring out the uniqueness of the PUI with respect to natural resources and livelihoods and this chapter tries to bring together the inter-relatedness of the issues and the most important policy highlights.

Agricultural Systems

As mentioned in Chapter 1, Hubli–Dharwad lies in a predominantly agrarian zone, so it is pertinent to first consider what perturbations arise from the location of an urban conurbation of almost 0.75 million in this rural scenario.

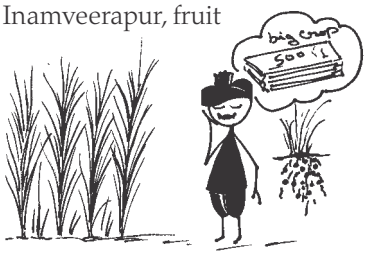
The first observation to be made about cropping systems is their great diversity. This diversity can be attributed to soil type, rainfall, irrigation and urban demand. In particular, irrigation is the major determinant of vegetable production in the PUI. Hubli–Dharwad lies almost astride a change from 'red' inceptisol (paddy) soils in the west to 'black' vertisol soils to the east. Additionally, climatically the city is situated in a transition zone from the well watered west to the semi-arid east, but the isohyets (i.e. the contours that link

locations with the same rainfall) run south to north. So two major factors that determine cropping systems are orientated in different directions to each other. Superimposed upon this are the effects of urbanisation and availability of irrigation. Therefore, almost any village sampled would have a number of unusual or even unique characteristics, so detecting changes against such background variation was not easy. Thus, to an extent, this project can only be regarded as filling gaps in knowledge in those villages actually studied. Despite the diversity, it is notable that staple crops were not an important use of land, particularly in the *kharif* season (south-west monsoon, when most rain falls), except in Mandihal where rice dominated (Fig 3.6., Chapter 3). Most crops grown were arable cash crops, particularly pulses, cotton and chilli, and orchard fruits. It should be noted that Hubli-Dharwad is not a major marketing centre for either cotton or chilli, so these crops are not necessarily evidence of effects of urbanisation. Indeed, the reverse might be the case, as both crops are harvested by hand in this area, which is very labour intensive (see below on wage rates).

Nevertheless, some trends were evident. To the west, two land uses dominated: mango and grass (post *rabi* summer fallow used for rough grazing). Area devoted to mango rose to a peak 2.5km from Kelageri (occupying 100% of land for one 500m stretch) and rapidly declined to 20% or less of land by 5km (Figure 3.1, Chapter 3). There are several reasons for the intensity of mango cultivation. The soils and the rainfall regime to the west of Hubli-Dharwad are considered to be particularly suitable for cultivation of mango. The most widely grown variety, 'Alfanso', is valued as a dessert fruit and is consumed locally and is also exported. Besides fresh sales in the market or at roadside stalls, there is a mango canning factory in Hubli. Orchards benefit from a favourable taxation regime and is a favourite form of 'annuity' for retired high ranking public servants who live in the city. Instances of this have been recorded around Delhi (Bentinck, 2000), where wealthy urbanites buy country properties, retaining the designation 'farmhouse' to suggest agricultural land use because the owner intends to maintain it as untaxed agricultural property.

Around Hubli-Dharwad, there is also evidence that tree fruits are being planted by farmers due to labour shortages. Contractors take on management of the orchards and supply labour from more distant areas to harvest the crop, and this is shared between the owner and the contractor on a mutually agreed basis. This is a consequence of competition for wage rates between urban and rural areas. A typical daily wage rate for unskilled labour in the city is Rs80 for men and Rs60 for women, whereas the respective rural rates are Rs50 and Rs25.

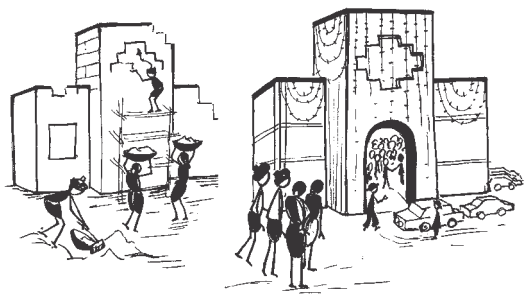
The other main effect of urbanisation evident was cultivation of vegetables and fruits. Vegetable production was observed at Gabbur, south of Hubli, where irrigation with sewage polluted waste-water was practised, and north of Dharwad where farmers around Pudakalkatti had invested in borewells (Fig 3.2, Chapter 3). In both villages, vegetables were raised in the summer months when prices were three to five times those obtained during the monsoon. In Kelageri and Inamveerapur, fruit production is important (Figs 3.7 and 3.15, Chapter 3). Thus, the presence of



urban markets combined with availability of irrigation created an opportunity for farmers to raise cash crops.

The other system where a clear effect of urbanisation was evident was dairying, which has turned out to be an important livelihood for the peri-urban landless. Near the city, buffalo numbers have increased over the past decade (Figs 7.1, 7.2 Chapter 7), particularly in landless households. This phenomenon has a number of parallels with vegetable cultivation, which is also on the rise. Both products are perishable, particularly milk, and so need to be produced near markets. Also, efficient marketing chains exist (Figs 6.1 and 6.2, Chapter 6). For the peri-urban poor, direct sales have helped cut out middlemen allowing them a better price and greater profit margins.

In 2000, the mean number of buffalo per household in distant villages was 1.4, whilst in villages near the city it was 3. In 1990 the respective figures were 1.2 and 2.1, (Fig 7.1 Chapter7) but in Bidnal, the landless sector owned an average of 4.0 buffalo per household in 2000. Buffalo can be stall-fed or grazed on non-cropped land such as field margins and so are suitable for households with little or no land. Indeed, within the city urban dairies exist where all fodder is bought and animals are stall-fed (Nunan, 1999). Hubli-Dharwad is a huge market for milk which is not being met by current supply chains and thus represents a significant opportunity, but the major constraint for the peri-urban poor is lack of fodder availability and grazing land. Thus for the fodder bottleneck to be addressed, a fodder belt is required in the PUI. Formal credit is available to peri-urban producers through rural credit schemes. Informal credit is typically available to peri-urban milk producers from their customers, free against the future supply of milk. However, for the peri-urban poor coming under the municipality, formal credit becomes a bigger constraint than for those villages outside the municipal area.



The peri-urban milk producer is flexible in addressing market demands. For the urban poor who can only afford small quantities or low quality (adulterated) milk, peri-urban producers are the only source which caters to these requirements, while for other classes as well, these producers cater to all sections of market demand. Programmes to promote dairy production that facilitate milk delivery credit, fodder and veterinary care for peri-urban areas may be a factor which will increase livelihood opportunities for the poor in the PUI.

Implications for poverty reduction exist for both milk and vegetables. Irrigated vegetables require both land, a bore-well or a pump for lifting waste water from open streams. Thus, the landless are excluded directly from this activity, although they may be employed as agricultural labourers or in marketing of vegetables. However, keeping buffalo for milk does seem to be a livelihood strategy adopted by the landless sector. In rural areas in India, the landless are traditionally regarded as being among the poorest. In the peri-urban interface this is not always true. These results contrast with those from more rural environments in India (Thomas *et al.*, 2002), where the landless and those with little land (< 0.2ha) keep few ruminants per household, but thereafter the number of large ruminants

increases with size of land holding, these changes being related to availability of crop residues and by-products. Like milk, vegetable demand is currently not fully met by peri-urban producers. Therefore there is scope for increasing vegetable production to meet urban demand and promoting vegetable selling by the peri-urban poor. Promotion of this livelihood option could be through revolving funds of SHGs (Self Help Groups or Sanghas) or cooperatives or forming of vegetable boards. For women in particular, promotion of dairy, vegetable selling, goats, and sheep rearing are important livelihood options. Exposure of women to markets and the role of NGOs becomes important (Box 3.5, Chapter 3) in mobilizing women and building their capacities in this regard.

Livelihoods

Consideration of livelihoods showed that in the description of characteristics of the poor (as perceived by others in the village), the landless or small land holders were often assumed by others to be agricultural labourers (Chapter 5). Other occupations, apart from construction and quarry labour, were rarely mentioned. In the livelihood analysis study it was found that the poor tended to rely on a far more diverse range of activities but continued to depend more significantly on others for employment. This is an indication that even within the same community, perceptions of the poor and their actual circumstances may differ to quite an extent. It also indicates that knowing the poor and their circumstances takes some effort; a point which government departments need to heed, and even less is known about the peri-urban poor. For example, many landless or small landholders were found to have developed their own dairy or vegetable production enterprises, even on very small plots of land, gaining advantages of independence.

In general, the poor and the poorest in the PUI had the following characteristics:

- No or few productive assets, or assets that could be used for security (land, houses, cattle); i.e., low natural assets.
- Low skilled, low waged labourers; those more dependent on others for source of income, insecure casual work, seasonal; i.e. low human assets, but may be taking advantage of social assets. Social assets may be stronger in rural areas compared to the PUI but the opportunities for the peri-urban poor to use these social assets are higher.
- Dependence on diverse sources of income to earn a living throughout the year and/or to supplement income from main occupations; i.e., insecure financial assets.
- Households with high dependency ratio, and/or physical weaknesses are poorest, often having no choice but to rely on one source of income only; i.e., low human assets.
- Those who have incurred large debts to be paid back through provision of labour to the money lender; i.e., low financial assets.
- Opportunities to spend money in the city is another cause of poverty in the PUI. Furthermore these groups reported that being close to urban centres, attracted in-migrating relatives seeking employment, which required that they spend even more towards family consumption which further impoverished them.
- Diversity of occupations, where the poor and very poor relied on urban employment in

times when agricultural employment was unavailable.

It is concluded that the poor and very poor were characterised by deficiencies in a whole range of assets, not just financial.

Did proximity to the city have an effect upon the proportions of rich to poor? Following a comparison made between the pairs of villages along the four transects, it was not possible to say that the relative extent of poverty was greater nearer to or further from the cities (Table 5.1, Chapter 5). Factors such as:

- Access to transport and markets and consequently the availability of better livelihood alternatives (physical assets),
- Agricultural potential (natural assets),
- Ability to utilize urban opportunities or not (skills, health and mobility);

were found to have a greater influence than just distance from the city. However, a note of caution must be sounded: it should be noted that between-village comparisons were made by using wealth ranking. This method is comparative and so cannot provide data on absolute levels of poverty. Indeed, in research work conducted more recently in another large peri-urban village, those considered to be wealthy in one part of the village were considered poor in another part.[1] Quantitative estimates of poverty were not made in this study, but such discrepancies indicate that it would be appropriate to include these measures, also, to enable direct comparisons.

Livelihood activities of the poor and very poor derived from case studies of 32 such households in the eight case study villages had the following characteristics:

- Livelihood strategies composed of small scale agricultural or livestock production, trading of products (craft, wood, dairy products, fruit or vegetables), labouring activities (in agriculture, construction or commerce) or artisanal trades such as carpentry or plumbing (Table 5.3, Chapter 5).
- More of the poor category households were involved in activities with a greater level of independence and higher rates of income and greater diversity than the very poor group.
- The very poor had fewer employed in the better paid unskilled labouring jobs such as brick making and quarry labour than the poor, and less diverse sources of income, mostly because they had less capacity to carry out the more arduous work, fewer working members in the family and/or fewer alternatives due to reduced mobility.

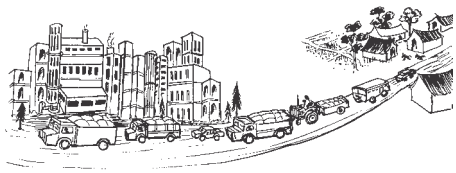
Therefore one way to address poverty in the PUI is through capacity building of the very poor, increasing livelihood opportunities which can be carried out in or near their homes. One mechanism is by formation of SHGs which can provide the financial, moral and marketing support needed.

One effect of urbanisation was that of the 32 poor and very poor households, nearly twice as many changes in livelihood activities were made in the nearer villages than the further villages (30, compared to 18), demonstrating a faster rate of change closer to the urban centres (Table 5.4, Chapter 5). However, there was no difference between the nearer and further villages in terms of diversity of livelihood strategies, as estimated by the Shannon – Weiner index. Twenty-one of the poor interviewed had changed their

occupations away from agricultural labour to non-agricultural unskilled employment, and another 24 moved into self employment, into commercial activities or new trades (11) or their own livestock (11) or agricultural (2) enterprises. This indicates that at least some of the poor may be benefiting from opportunities arising from urbanisation rather than becoming poorer, although some of the very poor remain intractably poor due to home circumstances (e.g., high number of dependants, infirmity). Therefore one option for the peri-urban poor is to increase the capacity and skills to take advantage of market demand driven opportunities.

Environmental and Health Effects

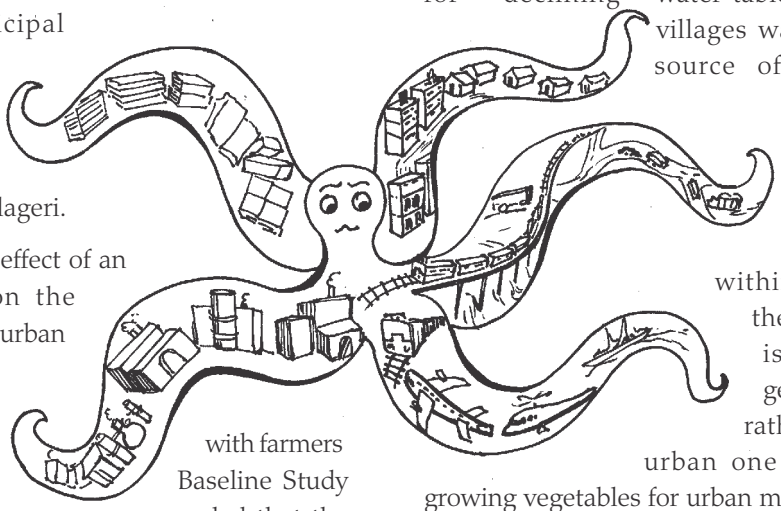
The effects of urbanisation processes upon health need to be understood. Some effects are obvious, such as faecal bacterial contamination or high organo-phosphate pesticide residues in sewage irrigated vegetables (Table 4.3, Chapter 4). These two factors should be of considerable concern to consumers, but there is no means of notifying purchasers of vegetables in the market of the circumstances of their cultivation. These include the cultivation of crops through sewage irrigation and the use of chemical pesticides in sewage cultivation. Thus advising urban consumers to cook well or disinfect vegetables before consuming them is one solution. In the long term however, treatment of sewage is a requirement and treatment plants are most important for safer vegetables and for the health of vegetable producers. There were also some indications (but not proven) of sewage contamination of ground water underneath Hubli-Dharwad finding its way along fractures in the aquifer rock strata to peri-urban wells and bore wells. Additionally, pressure to market produce to earn money may have adverse dietary effects. Data on consumption of milk by the landless showed that in villages near the city, they sold nearly all their produce and their household consumption had declined (Chapter 7). This occurred against a background of consumption of milk and milk products in India increasing by 6 percent p.a., more than three times the annual population growth rate (Delgado *et al.*, 1999).



The study also found evidence of environmental degradation attributable to influence of the city. Two examples are mining of clay in fields for making bricks (particularly prevalent in Kelageri) and quarrying for building blocks and road stones (particularly in Mandihal). These result in degradation of the top soil and loss of some land for farming. Data procured during the livelihood strategies component showed that in Mandihal there were 21 quarries occupying a total of 22.2ha, which is 5 percent of the cultivated land lost directly, but villagers complained that the dust coated vegetation over a wide area.

In Kelageri there were 23 operating brick kilns at the time of the survey. Area affected was not determined, but annual output of bricks from this village alone was 10 million, equivalent to 17,000m^3 of baked clay removed every year, or 0.6ha (1.5 acres) mined to a depth of 1m. The volume calculation does not allow for shrinkage during the baking process nor for shallower pits occupying a larger area, but it does give a first order approximation of the scale of land lost to productive use every year by this means. This effect is by no means confined to Hubli-Dharwad, and similar brick kilns may be observed near any

urban area in south Asia where suitable clay can be mined. Bentinck (2000) described how leasing of land for brick making operates near Delhi. Operators lease in about 5ha of land, and mine 1.5ha a year to a depth of 1.5m. He found that despite the removal of the most productive horizons of soil, about half the clay mining sites in Alipur Block, Delhi, were returned eventually to agricultural use. In 1997, by order of the Supreme Court, all kilns within the National Capital Territory boundary were forced to close down for being polluting industries (Bentinck, 2000). This is not the case within the Hubli-Dharwad Municipal Corporation boundary, as brick making continues unhindered in Kelageri.



Another possible effect of an urban area upon the surrounding peri-urban zone would be on water supply. Conversations with farmers during the Baseline Study (project R6825) revealed that the water table in peri-urban areas was falling, and tube wells were having to be sunk deeper to access ground water. Besides an unknown number of private, domestic borewells within Hubli-Dharwad, there are a number of industries with a requirement for water, and all these have their own wells as the municipal supply is irregular. It was hypothesised that the reason the water table was falling in peri-urban areas was because of abstraction within the city (Chapter 8).

In contrast, the water resources study found strong evidence that there is considerable recharge of the aquifer under the city due to leakage.

Calculations of leakage from the municipal water reticulation system and septic tanks (Fig 8.4, Chapter 8) indicated that rather than groundwater being depleted under the city, there was a net recharge of the aquifer. This was supported by data indicating dilution of groundwater beneath near-urban villages, but also with possible faecal contamination from septic tanks and leakages from the sewage system. Therefore, the hypothesis that abstractions within the city was responsible for declining water tables in peri-urban villages was rejected. The source of the reported declining water table levels must have been due to over-abstraction within the villages themselves, which is likely to be a general rural issue rather than a peri-urban one (except where growing vegetables for urban markets is a strong incentive to sink boreholes; Table 8.1, Chapter 8).

Sewage irrigation was found to be a lifeline for vegetable producers but resulted in what farmers refer to as "soil sickness", leading to poor crop growth, low seed germination and lower water infiltration rates into the soil. Furthermore the attraction of pests resulted in excessive use of pesticides which further contaminated vegetables used by urban consumers. Unlike other urban centres, in Hubli Dharwad fortunately industrial effluent is not a major source of contamination although hospital waste does continue to contaminate the sewage used for irrigation.

Land Use

Increases in urban populations and the need for better connectivity to the cities results in the growth of urban related infrastructure in the PUI. Thus the expansion of housing developments, railways, highways, by-passes and other roads are the "push" factors that lead to changing land use patterns in the PUI. This tends to drive up land prices and change land use patterns (Fig 2.3, Chapter 2). The concurrent shortage of labour is also a "push" factor in the PUI and can lead to the neglect or abandonment of land or increased land sales.

"Pull" factors that change land use would include increasing land prices as urban infrastructure develops, better urban employment opportunities for those who would be otherwise engaged in agriculture, tax holidays for urban investors (examples include farm houses and horticultural plantations), and selling or leasing of the land or the top soil for brick making and quarrying due to the demand from the construction industry. It is interesting to note that Hubli appears to be a stronger force for change than Dharwad. Land prices around Hubli are higher (Table 2.1, Chapter 2), as is the number of land sales. It is the larger of the two cities and is more commercialised, which may be the reason for the effects described.

The issue that needs to be addressed is the impact of these push and pull factors on natural resources in general, and on land use and the top soil in particular. A second factor is the impact on livelihoods, on urban sprawl and on poverty. Routing of the by pass, for instance, sometimes cut a productive piece of land into two sections, making it difficult and more expensive for farmers to cultivate. The shift to horticulture has decreased employment among agricultural labourers. Thus during the construction of urban infrastructure authorities need to pay heed to the livelihoods of peri-urban populations as much as attention is given to urban needs.

Spatial Extent of Urbanisation

How far does the influence of urbanisation extend? The effect of urbanization is not purely a function of distance from the city. The effect of urbanization on perishables can be seen in villages close to the city. For instance, milk and vegetable production is higher in villages close to the cities, given their perishability. The more perishable the product, the greater the concentration of production activity close to the city, as was observed for dairying.

In contrast, the effect on labour flows is far reaching well into the interior. Anecdotal evidence gathered during the DFID Baseline Study (project number R6825) indicated that in the village of Gudageri, 25 km south east of Hubli, larger landowners were not able to find sufficient local labourers for harvesting crops (at a wage they were willing to pay) and they had to bring in workers by tractor-drawn trailer from even further away[2]. This was because unskilled labourers were commuting to Hubli each day to work for higher wages, both by train and bus.

The impact of urbanization can be felt directly in terms of distance or indirectly in terms of degree of connectivity to the cities, by which is meant the degree or transportation infrastructure, be it in the form of roads or railways.

Thus, 'frictional distance' may be a more important factor than linear distance (Map 2.1). Thus this results in villages experiencing a high "frictional" distance when badly connected despite being close to the city in terms of linear distance. Varoor for

example represents the converse case where the actual distance is 17km south of Hubli, however it has all the peri-urban characteristics of villages closer to the city because it is situated on the Bangalore to Pune NH4 (Box 7.3, Chapter 7) There are also petrol pumps, small industries and commercial establishments such as shops and hotels that bring urban influences into this village. Like Varoor, Pudakalakatti, to the north of Dharwad, also lies on a main road connected to NH4. The roads in both villages greatly assisted marketing of milk and vegetables respectively. There was little evidence of these activities in Dasankoppa, within 8km of Dharwad, due to its poor road access.

Some villages also are less suitable for certain aspects of urban influences for various reasons. For instance in Bidnal, black soils (which swell when wet and shrink when dry, therefore damage deep building foundations) are not conducive to construction. Similarly the lack of underground water in Dasankoppa does not allow vegetable production. Also for example, farmers in Channapur, while being 12km from Hubli, due to poor access roads cannot transport fresh milk but have adapted their production systems to deal with this frictionality by supplying curds instead. Thus what would seem at the outset to be distinct peri-urban features may or may not all exist in any one village. Rather it is various processes of change that defines the extent to which a village is more or less peri-urban. Thus the "peri-urbaneness" of a village depends not only on actual distance, but also on the existence of urban infrastructure, the conduciveness of the village to particular peri-urban developments, and the effect being considered. Not only that, but the frontier moves as the urban area expands and the effects of urbanisation ripple outwards.

This inability to state categorically which effects of urbanisation will be present at any particular distance from a city, and to what degree, complicates matters when a dichotomous system of administration (urban and rural) operates, as in the case of Hubli-Dharwad. Management of such an inherently complex interface requires more flexible administrative structures than exist around most cities.

Processes of Urbanisation

In Chapter 1 it was argued that the peri-urban interface is not best defined as being a location, it is better regarded as being a process. The evidence produced in this study shows that urbanization processes are largely market driven. These processes have resulted in simultaneous processes of change in livelihoods, land use, natural resources including water, soil, and forests, and often reactive changes in local governance. The market forces are of two kinds: one that caters to the needs of individuals and urban households and the second that caters to urban commercial institutions from small hotels to large industrial/commercial complexes.

Urban needs and the resultant market demand leads to a series of changes in the peri-urban production systems to meet these demands. In agricultural systems, the most tangible peri-urban feature is the increase in production of perishables such as vegetables, fruit, milk and other dairy products. A feature of milk and vegetables is that of direct marketing for small scale producers, given their proximity to urban consumers. A large amount of natural resource use also caters to urban industrial and commercial activities including brick making, quarries, paper mills and agro processing units.

These changes in production systems result in concurrent changes in livelihood patterns for the peri-urban communities. This is reflected more starkly in the shift in employment of the peri-urban labour force or through a simple diversification of products or even through an expansion of sales of the same product for peri-urban producers. The shift or expansion of dairy production in the PUI for instance is due to easy market availability. The shift towards urban employment due to the seasonal nature of agricultural employment is an option for workers with the right skills, good health and mobility.

Consequently poverty takes on a different set of characteristics in the PUI. It becomes a function more of the capacity of the peri-urban population to utilize urban opportunities, in contrast to determinants commonly observed in rural areas such as low social status and stocks of natural capital. Thus the poverty in the peri-urban interface is more a function of poor health, high levels of dependents, less mobility, poor connectivity to the cities, or skills sets that do not match urban needs.

Urban needs also result in changes in land use patterns whereby urban residents start to buy up land for residential or commercial purposes or to avail of tax holidays. Commercial needs from the construction industry result in setting up of brick kilns, paper making units, quarries and so on. This then has an effect on the use of natural resources, often in terms of their degradation or neglect.

Finally the outward expansion of municipal boundaries often results in areas being transferred to new instruments of local governance. In the Indian context this means a change from the rural based three tier Panchayati Raj system to the municipal administrations. This leads to incongruities. This project found farmers leading essentially rural lifestyles but within the municipal boundary, thus being deprived of access to extension services and rural credit schemes on favourable terms. Lack of access to rural credit sources and government programmes potentially results in greater impoverishment of the very poor peri-urban populations that fall within the municipality. Another example of incongruity is where one sub-catchment (Mangundi) is divided between the Hubli-Dharwad Municipal Corporation and Dharwad District administration. The 'urban' part of the sub-catchment falls within an administration that has no watershed management policy whilst the 'rural' section is within the remit of the Watershed Development Department. The only sensible approach to catchment management is to treat it as a whole.

Policy Implications of the Study

Although it was not the primary purpose of this study to inform policy, some individual chapter authors have made some policy suggestions and in any case several findings do have relevance to management and administration of the peri-urban interface, particularly in regard to natural resources and livelihoods of people that depend on them. This volume will end by considering some broad principles applicable to policy, rather than attempting to be prescriptive.

Firstly, it has to be recognised that a **dichotomous** approach to administration and planning (i.e, administrations largely divided into urban and rural) is inappropriate in peri-urban areas. In India, the 74th Amendment to the Constitution[3] stipulates the setting up of District Planning Committees (DPCs) and Metropolitan Planning Committees (MPCs) for integration of

rural and urban planning and spatial and economic development for the entire district. The Karnataka manifestation of this is the Joint Planning Boards, which were created (at least in theory) to bridge urban and rural planning within each district. In practice there is only one example of such a Board (also referred to as a District Planning Committee) having been effectively constituted in Karnataka, in Bellary[4]. The Hubli–Dharwad Urban Development Authority (HDUDA; section on Institutional Structures Chapter 2), whose scope extends several kilometres beyond the boundary of HDMC, is almost exclusively focused on physical aspects of planning. As demonstrated by this study, a holistic approach to planning and administration of the peri-urban interface is required, cognisant of economic factors, people's livelihoods and aspirations, use of natural resources, environmental and health issues, and zoning and physical planning.

Secondly, the study discovered a great deal of diversity within the PUI, in terms of agricultural systems, dominating characteristics, access to resources, levels of wealth and consequent livelihood strategies, of each village. There is some evidence of greater diversity in villages closer to the city than those further away (the poor change livelihood strategies more frequently and cropping systems show more diversity). One consequence of diversity is that a 'one size fits all' approach to management is unlikely to be effective in achieving objectives. Programmes to alleviate poverty ought to take into account the different nature of poverty in the PUI compared to rural areas and the very diverse livelihood strategies of the poor here, particularly as they seek to take advantage of the opportunities that urbanisation provides. Similarly, agricultural development programmes will be more effective if they take into account diversity in farming systems and sometimes the rapid changes that occur. For example, would it be possible to devise a programme to encourage risk-averse small scale farmers to experiment with new cropping systems by under-writing the risks involved? Such schemes to encourage people to remain on the land will contribute to lessening the numbers of rural dwellers who migrate to cities in an attempt to escape poverty.

Thirdly, the **non-static** nature of the PUI needs to be factored into administration. As the title of this book implies: the frontier moves on. Today's peri-urban area will be tomorrow's suburbs; today's rural area will be tomorrow's peri-urban interface. Thus, for a given locality, the peri-urban interface is a temporary state. Additionally, it is important to recognize that the extent of the effects of urbanisation depends on the nature of the influence. For milk production, for eg., there is evidence that the reach into the interior is quite shallow, whilst competition between rural and urban wage rates extends much deeper. Therefore, any administrative mechanism developed will have to allow it to expand over time; otherwise it risks becoming fossilised as another anachronistic tier of administration.

No one pretends that addressing the issues raised above will be a simple matter. But ignoring the existence of the peri-urban zone is not an option either. It is not just a matter of correcting the negatives such as health risks arising from sewage irrigation of vegetables, for instance; but ignoring the special circumstances prevailing in the PUI runs several risks. The first of these, concerns the fact that most existing solutions are piece meal. These address at best half of the problem. Urban solutions often have serious

rural repercussions and vice versa.. Thus, integrating rural and urban planning will first and foremost result in more holistic solutions. The second is that of future expansion and the need to plan effectively for the future PUI. The third is around the need to address poverty in the PUI, and to plan poverty reduction by facilitating new enterprises such as zero-grazing dairying and vegetable vending, to take but two examples.

If this volume has stimulated some to think afresh about that belt that surrounds all our cities, if it has sparked the idea of some new line of enquiry in a researcher's mind, if it has encouraged a government officer working with farmers to find ways of helping them make the most of opportunities presented by living near the city; then its purpose will have been achieved.

END NOTES

1 Survey conducted by the University of Agricultural Sciences, Dharwad and India Development Service, Dharwad, in Mugad village in 2002.

2 Interviews of land-owning farmers by R. M. Brook, 1997.

3 The Constitution (74th Amendment) Act 1992, Government of India

4 Personal communication: Secretary to Government of Karnataka, Urban Development Department, to A. Allen, October 2002.

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