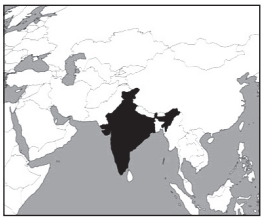

The peri-urban interface in Shahpur Khurd and Karnera, India

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ABSTRACT This paper describes the peri-urban interface in two villages – Shahpur Khurd and Karnera – located in the state of Haryana in north-west India, and close to Delhi, India's capital. The paper argues that devising policy interventions for the peri-urban interface requires explicit attention to strengthening rural–urban linkages that materialize through the two-way flow of goods and services between villages and urban centres. Improving transportation and connectivity have a clear role in this, and this requires collaboration across not only rural and urban governments but also across authorities at various levels – village, state and national. As the peri-urban interface emerges, there is a need for protecting common property resources that are diverted to other activities and purposes, or to provide an alternative to those who have conventionally depended on them for their sustenance. Finally, improving the quality of life in peri-urban settlements requires explicit attention to the siting and location of factories, which can adversely impact the quality of life of peri-urban dwellers.

KEYWORDS India / institutions / livelihoods / peri-urban / sustainability / urban development

I. INTRODUCTION

The term peri-urban is used by researchers from many disciplines and paradigmatic perspectives to describe contradictory processes and environments.(1) There is no single satisfactory definition of the peri-urban interface and different definitions are understood to apply in different circumstances.(2) They may even change in the same location over time, for example as a medium-sized city becomes a large one.

The word "peri-urban" could be used to denote a place, concept or process. As a place, it can refer to rural fringe areas surrounding cities. As a concept, peri-urban could be seen as an interface of rural and urban activities and institutions. As a process, it could be thought of as the two-way flow of goods and services and a transitional stage between rural and urban.

Iaquinta and Drescher question the tendency to define peri-urban in terms of geographical location of a place in relation to urban centres but, rather, underpin the importance of the underlying institutional contexts.(3) In a similar vein, Brook, Purushothaman and Hunshal caution against the tendency to treat peri-urban as a place, and argue that it is better understood as a process.(4) This means that proximity to urban centres in

1. Iaquinta, David L and Axel W Drescher (2000), "Defining peri-urban: understanding rural–urban linkages and their

itself does not define peri-urban – rather it is the existence of both rural and urban characteristics and the linkages between the rural–urban and the flows of goods and services. This gives rise to different patterns and kinds of peri-urban interfaces.

The peri-urban interface could, in fact, be understood as a social, economic and environmental space where three systems constantly interact: the agricultural system, the urban system and the natural resource system.[5] The population here is seen as having a foot in both the urban and rural worlds. However, the degree to which this occurs varies across segments of the population. For instance, peri-urban dwellers who commute to towns interact much more in both worlds than subsistence farmers who do not commute. Peri-urban populations can be heterogeneous in terms of the extent to which they participate in the flows of goods and services between villages and urban centres.

The peri-urban interface has distinct environmental, social and institutional characteristics, although their intensity varies from one peri-urban context to another and any attempt to generalize on these is fraught with severe limitations. From an environmental perspective, the peri-urban interface could be understood as a heterogeneous mosaic of natural ecosystems, productive or agro-ecosystems, and urban ecosystems affected by the material and energy flows demanded by both urban and rural systems.[6] The relationship between these sub-systems is mutually constitutive and cyclical: each sub-system both conditions and is conditioned by the other two.

Socially, the peri-urban interface is interesting as social groups can be quite heterogeneous and in constant transition. Small farmers, informal settlers, industrial entrepreneurs and the urban middle class may all co-exist in the same territory, although with different and competing interests, practices and perceptions.[7] Iaquinta and Drescher note that peri-urban areas are socially dynamic in nature, wherein social forms are constantly created, modified and discarded.[8] They are areas of social compression or intensification where the density of social forms, types and meanings increases, fomenting conflict and resolution.

Institutionally, too, the peri-urban interface is complex, since some administrative activities may fall outside the purview of rural and urban governments. Peri-urban constitutes a range of activities lying between strictly urban and rural jurisdictions. For instance, a study on the peri-urban interface in the Hubli–Dharwad region found that it was difficult to install a sewage treatment plant as it was not clear who would pay for it – the urban or the rural government.[9] At the same time, peri-urban dwellers are confronted with both urban and rural laws and institutions, breeding a situation of legal pluralism. In many African countries, for instance, statutory and customary laws co-exist and often overlap, where formal and informal land market transactions are increasingly important, often restricting access to low-income groups.[10]

The co-existence of such diverse interests, groups, activities and institutions poses practical problems in developing policy options for the peri-urban interface; this is aggravated by the fact that geographically, the boundaries of peri-urban keep shifting as rural activities and processes are replaced by urban activities and processes. At the same time, the very nature, pace and location of the peri-urban interface makes it difficult to bring it under direct means of control and regulation.

connection to institutional contexts", Paper presented at the Tenth World Congress of the International Rural Sociology Association, 1 August 2000, Rio de Janeiro, 25 pages.

2. Brook R, S Purushothaman and C Hunshal (editors) (2003), *Changing Frontiers: The Peri-urban Interface Hubli–Dharwad, India*, Books for Change, Bangalore, 146 pages.

3. See reference 1.

4. See reference 2.

5. Allen, A (2003), "Environmental planning and management of the peri-urban interface", *Environment & Urbanization* Vol 15, No 1, April, pages 135–147.

6. See reference 5.

7. See reference 5.

8. See reference 1.

9. See reference 2.

10. Tacoli, C (2002), "Changing rural–urban interactions in sub-Saharan Africa and their impact on livelihoods: a summary", Working Paper 7 in Rural–Urban Interactions and Livelihood Strategies Series, IIED, London, 40 pages.

This paper presents case studies of two villages located in the peri-urban interface – Shahpur Khurd and Karnera in Ballabhgarh Block of Faridabad district in Haryana in northwest India. The paper concludes that policy interventions for the peri-urban interface require explicit attention to strengthening the rural–urban linkages that materialize through the two-way flow of goods and services between villages and urban centres, as shown in the case studies. Improving transportation and connectivity have a clear role in this. Furthermore, this calls for close collaboration between governments at various levels – national, state and local. There is also a need to protect common property resources, which get diverted to other activities and purposes even though they are crucial for the livelihoods of the peri-urban landless. Finally, improving the quality of life in peri-urban settlements requires explicit attention to the siting and location of factories, which adversely impact the quality of life of peri-urban dwellers through their proximity.

The paper uses the case study method of research,[11] which is an empirical inquiry investigating a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident and where multiple sources of evidence are used. The case study is used to present a portrait of a particular social phenomenon,[12] and is often considered to be the most flexible of all research designs, largely because of the ability to draw from a number of data sources.

The research relies on an ethnographic research approach, drawing on semi-structured interviews with peri-urban dwellers, key informants and focus group discussions. Semi-structured interviews were held with members of different social groups in the villages under study in order to obtain different perspectives. Key informants such as the elected village head (*sarpanch*), opinion leaders in the village and the village high school teacher were chosen for their competence and relevance. Focus group meetings were held separately with minority groups such as potters, Harijans – a minority group in the village that faces social exclusion – and women, in order to understand issues and problems from their perspectives.

11. Yin, R K (1984), "Case study research: design and methods", Applied Social Research Methods Series Vol 5, Sage Publications, Thousand Oaks.

12. Hakim, C (1987), "Research design: strategies and choices in the design of social research", Contemporary Social Research Series 13, Allen and Unwin, London.

II. FARIDABAD DISTRICT

Faridabad district is in the state of Haryana, one of India's major food grain producers in northwest India, and is situated about 25 kilometres from Delhi, the national capital (Figure 1). The district comprises about 5 per cent of the state's total land area and accommodates about 10 per cent of its population. According to the 2001 census, Faridabad is the most densely populated district in the state, with 1,020 persons per square kilometre compared to 372 for the state of Haryana as a whole.

Well-connected road and electricity networks have fuelled the district's growth. The Delhi–Mathura national highway No 2 (Shershah Suri Marg) passes through its centre, and a Central Railways broad-gauge railway line also passes through it. Most of the trains going to the south and west of India pass through, and there is a railway station in Faridabad city, located on the Delhi–Mathura double-track broad-gauge line of the Central Railways, which runs parallel to highway No 2.

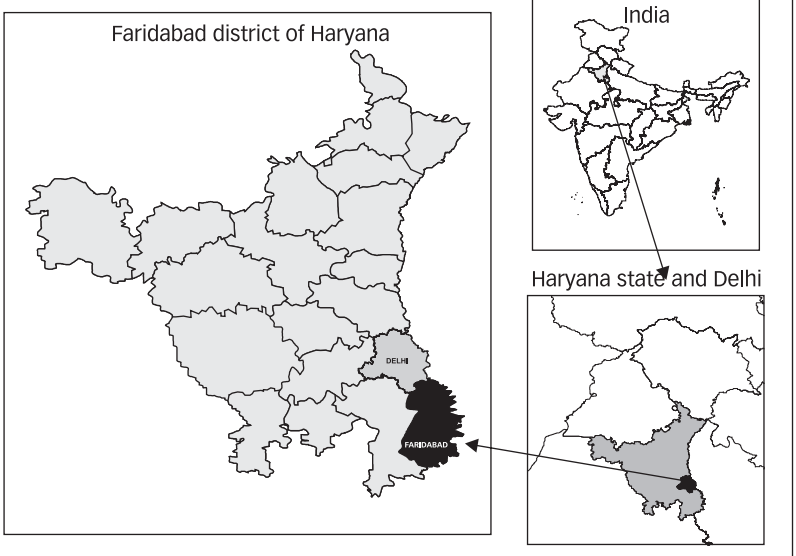

FIGURE 1
Location of Faridabad district

Faridabad is also a major industrial hub of northwest India. There are now reported to be about 15,000 small, medium and large industries providing direct and indirect employment to nearly half a million people in and around the district. Many international and multinational companies have located their industrial establishments here and the district is reported to have about 2,471 registered factories.

III. SHAHPUR KHURD

Shahpur Khurd is a small village in Ballabhgarh Block of Faridabad district, comprising 150 households and a population of about 1,000 people. It is believed that the village was settled about 400 years ago.

a. Social organization

Four different social groups inhabit the village: the Jaats, the Harijan, the Koli and the Bhangi. The village is dominated by the Jaats, the agriculturists, who are the most powerful group socially, economically and in terms of land ownership, and constitute 70 per cent of the village population. The Harijans represent 25 per cent of the population, and the Kolis and Bhangis are in a minority. The Bhangis undertake menial jobs and the Kolis are engaged in weaving activities.

b. Agriculture and irrigation

Shahpur Khurd has the typical cropping pattern of northwest India, except for paddy and sugarcane, which are the more water-consuming

crops. The monsoon season crops are pearl millet and sorghum, while the winter crops are wheat, *burseem* (a fodder crop) and mustard. This cropping pattern prevails mainly because of limited possibilities for irrigation – the groundwater is saline and only about 10 per cent of the cultivated land is served by a canal. This allows for only a small minority of farmers to engage in the cultivation of paddy and sugarcane, the other two crops widely grown in northwest India.

Borewells are the main source of irrigation water for wheat, and most are diesel-powered. Almost all farmers engaged in wheat cultivation own private borewells although there is also some selling of water. Groundwater is sold at a rate of Rs. 40 per hour; in other words, people are charged to use other people's diesel-powered borewells at an hourly rate.

Irrigation from the canal is governed by a *warabandi* schedule, which specifies a day and time for each farmer to irrigate his fields. The schedule is not always followed and farmers often deviate from it and exchange times to suit themselves through a system of mutual cooperation and understanding called *bhaichara*, which is based on kinship ties and affinity; this practice is widely prevalent in other parts of the state.[13]

Not only is the groundwater saline but the farmers are also vulnerable to an uncertain and intermittent water supply from the canal. There are several reasons for this. First, canal irrigation systems in northwest India are "protective" in nature,[14] that is, they are not meant to provide all the crops' water requirements but only a part. This is achieved through a system of rotation, whereby distributaries supplying water operate in turn. Second, farmers have no prior information about when the water will be available. And third, the village is located at the end of the canal, which aggravates the situation; much water is over-appropriated upstream or seeps through the canal walls before reaching the village. Thus, the village does not receive its authorized share of water from the canal.

13. Narain, V (2003), *Institutions, Technology and Water Control. Water Users' Associations and Irrigation Management Reform in Two Large-scale Systems in India*, Wageningen University Water Resource Series, Orient Longman, Hyderabad, 244 pages.

14. See reference 13.

c. Institutions for natural resource management and conflict resolution

Local institutions of governance based on forms of social organization co-exist with statutory organizations. The village *panchayat* is the unit of self-government at the village level, and there is a local *panchayat*, which is a congregation of village elders, as well as a statutory *panchayat*. Discussions with villagers revealed that conflicts at the village level go first to the local *panchayat*, then to the statutory *panchayat*, and finally to the *thaana*, or police station. Thus, there is a hierarchy of conflict resolution mechanisms.

We also noted an interface of statutory and non-statutory forms of resource allocation, especially with regard to water. As noted above, there is a statutory *warabandi* schedule – which defines a farmer's water right and determines the pattern of resource allocation; however, farmers engage in an exchange of their time allocations based on *bhaichara*.

d. Rural–urban linkages

Shahpur Khurd reveals several characteristics of the peri-urban interface that are highlighted in the peri-urban literature: the co-existence of rural and urban forms of land use, and a two-way flow of goods and services between the village and adjoining towns.

Over the last decade, some agricultural land has been acquired for non-agricultural purposes. This was predominantly private land sold by the agriculturists in the village. Of a total agricultural land area of 180 acres, about three acres were taken over for industrial purposes and this is where the factories inside the village boundary are located. About 15 acres were taken over by urban residents for farmhouses, which are essentially second homes for the urban elite and are for recreational purposes. It is common for urban residents to host social gatherings in them. About 18 acres of land were given over to brick kilns for making bricks for local urban construction; some forest lands around the village were also acquired for this purpose. A key informant reported that in the coming years, agricultural land use in the village was expected to diminish even further.

This form of peri-urban interface has provided some opportunities for the village inhabitants in the face of the diminishing size of landholdings and diminishing agricultural productivity. The size of landholdings has decreased as a result of increasing population size and the fragmentation of landholdings between a larger number of family members. At the same time, there is no secure source of water supply and thus no alternative agriculture-based livelihood opportunities.

In this context, the emergence of factories in the areas around the village has provided some livelihood opportunities for village inhabitants. The nature of this employment is casual, however, and only for short periods during the year when farmers are not engaged in agricultural activity, although discussions seemed to suggest that most households had at least one youth employed in these factories.

There are positive linkages between Shahpur Khurd and the neighbouring towns. The latter serve as markets for agricultural produce, as well as a source of agricultural labour and of supplies of essential fruit, vegetables and other commodities. The inhabitants depend upon the adjacent towns of Sikri and Ballabhgarh for essential commodities, and vendors come to the village from Ballabhgarh to sell fruit and vegetables. This is an important linkage as Shahpur Khurd is unable to grow its own fruit and vegetables given the poor availability of water, both in terms of quality and quantity. Proximity to Delhi has also ensured a market for dairying in the village, with the milk produce being sold directly in Delhi. However, although the village is located close to the towns, it does not benefit from the same water and electricity supplies, which are erratic and limited to only a few hours a day.

e. Transport and connectivity

People commute to Shahpur Khurd from the neighbouring towns to work in the factories and in agriculture. At the same time, people also move from the village to the neighbouring towns to work there. While the village depends strongly on proximity to the towns for its supply of fruit and vegetables and for markets for agricultural produce, much is left wanting in terms of the roads that connect the village to the towns.

This is complicated by the multiplicity of organizations that have a stake in developing roads in the village. Given the peri-urban nature of the village, the development of roads for connectivity to the adjacent towns involves three different layers of government. The road connecting

the village to the highway is unpaved and falls within the jurisdiction of the state government. The national highway (the Delhi–Mathura highway or national highway No 2) links Shahpur Khurd to the town of Ballabhgarh and is the responsibility of the central government. And the village roads within the village boundary are the responsibility of the village *panchayat*.

Sikri is located about 1.25 kilometres from Shahpur Khurd and is an intermediate point for villagers on their way to the principal town of Ballabhgarh. However, a major problem faced by the inhabitants is the absence of transport or connectivity to Sikri, and village inhabitants said that some form of transport (such as an auto-rickshaw) was needed.

Furthermore, it is important to note that the demand for peri-urban transport is gendered, whereby men can take a lift on a bicycle or a motorcycle whereas women must often walk to Sikri before finding connecting transport to Ballabhgarh. Another common concern expressed by the inhabitants was that having a *pukka* (paved) road to the highway could reduce the time, effort and costs incurred in commuting to town, which was an essential part of their daily lives.

f. Village ponds

An important impact of the peri-urban interface is that the locus of control over village resources has shifted to outside the village, as urban dwellers take part in the auction of village ponds and lands.

There are three ponds in the village that cater primarily to the drinking water needs of the livestock and which were managed originally by the villagers through collective contributions of labour and capital. However, now they are poorly maintained and the village *panchayat* puts one of the village ponds up for auction on an annual basis, the proceeds from which are used for welfare activities by the village *panchayat*. The pond is used by contractors for fisheries purposes and they retain the proceeds from the activities. However, the village residents are not primarily engaged in fishing and the contractors come from the neighbouring towns, notably Delhi and Ballabhgarh.

g. Common lands

Very little is left in the village by way of common lands. This has important equity implications given that traditionally, the poor tend to depend upon common lands and other common village resources for their survival. After the process of land consolidation took place, some land remained, which was given to the village *panchayat*.[15] It comprised about one acre of what used to be grazing land, and surrounded the village ponds. In 2002, however, the *panchayat* installed a tubewell on the land to supply drinking water to the village.

15. The state government carried out land consolidation in 1952. This was part of greater efforts and policies to secure redistribution of land among the landless.

h. Energy

Energy sources for household purposes have been mainly dung cakes and fuelwood. The interviewees informed us that they got fuelwood from "wherever they could" and there are some sales of dung cakes. There has

also been some energy transition in terms of a move towards the use of LPG (liquefied petroleum gas), a fairly recent phenomenon that began about 10 years ago.

LPG cylinders are brought to the village from a neighbouring village located about 1.5 kilometres away. Women who work in the adjoining towns prefer LPG cylinders, as they find them more effective and efficient and they are seen as more practical for working women. However, it was difficult to estimate the extent of the conversion to LPG since houses tended to switch between modern and traditional fuels depending upon availability and convenience.

The peri-urban interface has clear implications for sources of energy, especially for the poor and the landless who do not have access to private lands. Some people in the village used to collect fuelwood from the forest lands around the village but, as noted above, this land has now been taken over for the construction of brick kilns and factories, thus affecting the sources of energy.

i. Environmental effects of the peri-urban interface

As noted earlier, the peri-urban interface provides some employment opportunities in the face of a diminishing size of landholding and the absence of alternative sources of livelihood. However, the location of factories in close proximity to the village has various negative impacts on the quality of life of the inhabitants.

A factory manufacturing bus parts is located on the boundary of the village and has been there for about six years. In our interviews, the inhabitants complained about air and noise pollution caused by the factory, which had been relocated from Delhi. We sensed that there was a lack of political unity in the village to combat the problem, and there had been no efforts to relocate the factory.

Chemical discharges from the factory enter the groundwater, and a borewell that is used by the villagers was polluted. The construction of the factory also disturbed the route that the villagers took to the fields, causing more inconvenience. The villagers identified noise pollution as a major irritant and distraction and there were also complaints about bad odours and ground vibrations throughout the day.

A common concern expressed by the villagers was that there should be some norms relating to the location or siting of factories and brick kilns in terms of distance from the village boundary. A popular sentiment also was that they should be located away from religious places.

IV. KARNERA

The village of Karnera is also in Ballabhgarh Block of Faridabad district. It has a population of 2,000 people and comprises about 200 houses.

a. Social organization

Of the 200 households, about 80 comprise Tyagis, who are agriculturists. They are the most powerful community in the village, socially, numerically and in terms of land ownership. Five households comprise Brahmans,

who have traditionally been the priests but also practice agriculture. Sixty households comprise Harijans, who are engaged in menial activities. Ten households comprise Kumbhaars, who are engaged in pottery and agriculture. Ten households comprise Khatis, who are engaged in carpentry and labour. Three or four houses comprise Gowariyas, who work mainly as labourers, three households comprise Jaats, who are engaged in agriculture, and four households comprise Bhangis, who are engaged in menial activities.

b. Village *panchayats* and governance

The village has about 400 electoral votes. The last *panchayat* elections were held in 2000, and prior to that in 1995 and 1990. As in the case of Shahpur Khurd, there is a hierarchy of conflict resolution mechanisms. Conflicts normally go first to the local *panchayat*, which consists of representatives of all the castes who live in the village and is selected by picking two people from each of the eight wards in the village. The meetings take place in public meeting places such as the *panchayat* office, the school grounds, or other community places such as the *chaupal,* a meeting place for the village community. There is also a statutory *panchayat* that looks after the provision of village amenities such as drinking water, borewells and laid out pipes.

c. Agriculture and livelihoods

The main crops grown in the village are wheat, potato and *burseem* (a fodder crop) in the winter season, and pearl millet, paddy, sorghum and vegetables (gourd and okra) in the monsoon season. There is no sugarcane cultivation in the village, the major reason cited for this being the inadequate water supply. Another factor is the distance to the nearest sugar mill, which is located in Palwal, about 30 kilometres away. Neither is there any cotton cultivation in the village. However, there is a village dairy that procures milk from the farmers, some of which is transported to Ballabhgarh and sold directly in the city.

There are about 1,600 acres of cultivated land in the village, all of which has been brought under irrigation. The fields are irrigated with both canal and groundwater. Two hundred acres of the cultivated land are irrigated through the Sikrona minor[16] of the Gurgaon canal. Two hundred acres are irrigated using electric tubewells and the remaining land is irrigated using diesel pumps. Another source of irrigation is the Gurgaon sewerage canal that originates in Delhi.

16. A minor is a smaller canal that brings water from the distributary and branch and main canals to the farmers' fields.

Canal irrigation is governed by a schedule, as in Shahpur Khurd. However, again as in Shahpur Khurd, farmers do not always follow that schedule and deviate from it on the basis of their own *bhaichara*. Farmers pay irrigation fees twice a year, at the end of each cropping season, and are charged according to the type of crop. For paddy, they pay Rs. 40/hectare, whereas for wheat they pay Rs. 20/hectare.

d. Common lands

As in Shahpur Khurd, there is very little common land left in Karnera. There are about 45 acres of *panchayat* land whose use is auctioned for a

two-year period. This practice of putting land up for auction has existed ever since the *panchayati raj* system came into being. At present, all of the *panchayat* land is under cultivation.

There are also about 32 acres of what used to be grazing land, which remained after land consolidation was carried out in 1952 and which was given to the *panchayat*. Use of this land is also auctioned off, and those winning the contracts come from both within and outside the village. At present, this land is also under cultivation.

e. Village ponds

There are five village ponds, three of which are auctioned for fisheries, again through the *panchayat*. Prior to 1952, the villagers were responsible for the upkeep of the ponds. After 1952, when the *panchayat* took over the ponds, the tradition of auctioning began. The proceeds are used for welfare activities and the upkeep of the village.

The results of the auction usually appear in the newspaper, and the contractors work the ponds for a period of 2–3 years. The fisheries are usually worked by Muslims who come from outside the village (predominantly from Delhi), and the adjacent towns provide a market for the fish. The ponds are also used for the cultivation of a fruit called *singhara*.

An important impact of the practice of auctioning the ponds is that the Kumbhaars have lost their right to a livelihood. Their traditional occupation was pottery, however, they no longer have access to the clay that they used to get from the ponds. The potters do not have any land and they now work predominantly as agricultural labourers. They depend on fields belonging to the Tyagis for their supplies of fodder, and also collect some from the forest lands that are under the jurisdiction of the Public Works Department. Their main sources of fuel are dung cakes and fuelwood from the private lands of the Tyagis.

f. Rural–urban linkages

As in Shahpur Khurd, Karnera displays the peri-urban characteristics of land conversion from agricultural to non-agricultural purposes. Three acres of agricultural land have been taken over by a hostel and five acres by a factory.

A factory was established within the village boundary about five years ago that makes packing material for a corporate giant located in the city of Faridabad. The land on which this factory was built was earlier agricultural land (about three acres). The villagers complained about the pollution from the factory and put pressure on the owner to raise the height of the chimney. A charcoal factory was built about four years ago, which also pollutes the atmosphere and generates a foul smell.

These factories provide occasional employment to some villagers. The main reason cited by the peri-urban dwellers for seeking employment in the factories was excessive land fragmentation, the absence of a secure source of water supply and the absence of alternative sources of employment in the village. However, this employment is typically seasonal, usually when the farmers are not engaged in agricultural activity.

As in Shahpur Khurd, there are strong positive linkages with the towns. On average, at least one or two persons from each household work in the factories in the neighbouring towns of Ballabhgarh, Faridabad or Badarpur.

The main markets are located in Ballabhgarh and Faridabad, and the villagers depend on them for clothes, fruit and vegetables and supplies of essential commodities. Agricultural produce is sold in Ballabhgarh, and some labour also comes from there (and from adjacent villages) during harvest time in Karnera. There are no banks in the village and the inhabitants have to go to Ballabhgarh to obtain credit and loans. There is a small dispensary in the village, but for emergencies and other medical and health needs, they must go to Ballabhgarh or Faridabad.

g. Transport and connectivity

The transportation needs of the peri-urban dwellers revolve around commuting to the adjacent towns for the purposes of work, education, health services, marketing their agricultural produce and for the purchase of domestic provisions and supplies.

Transportation and connectivity play an important role in the choice of markets. Agricultural produce is sold at the Ballabhgarh wholesale market and there are others at Palwal and Faridabad. Rates for the produce vary from market to market. People prefer to go to Ballabhgarh to sell their produce, as it is closer, but they get a higher price in Faridabad; however, it is located about three kilometres further away.

Villagers commute using public buses operated by the state roadways, also tractors and three-wheelers. There are buses to Ballabhgarh and Sohna that pass through Karnera but these are somewhat unreliable and infrequent. Given this, an important means of semi-private transport that has emerged are auto-rickshaws, which provide intermediary transport between the village and the highway. There are about five or six three-wheelers in the village, which charge about Rs. 5 (about US$ 0.10) per passenger. This is the same rate as the public buses but they are preferred on account of their higher frequency. There are about 25 tractors in the village that are used primarily for transporting agricultural produce to the neighbouring towns. Some of the village inhabitants also rent out the tractors. A few households have bicycles or scooters that are used for travelling to town for smaller purchase requirements or for immediate medical needs.

The most important problem identified in the village was the poor quality roads. They are made of brick and the inhabitants feel that they should be cemented. The road towards Rajeev Colony – an intermediate road that connects the village to Ballabhgarh – is flooded during the rains and is a major cause of accidents. The village inhabitants have often complained to the member of the State Legislative Assembly, however this has had no effect. Since this road essentially connects the village to the town, it does not receive the same priority as the main road or the highway.

h. Energy

The main sources of fuel for cooking are fuelwood, dung cakes and LPG. People who have agricultural holdings obtain wood and fodder from their own lands. Of those who do not have any land, about 3 per cent buy what they need while the rest get it in lieu of agricultural wages.

Approximately 50 households use LPG, which has been in use for the last seven or eight years, and the cylinders come from Faridabad about

twice a month. LPG is thought to be a bit expensive and the distribution system is not very effective. Many of the village inhabitants expressed this concern. Dung cakes are used for warming milk and water in the winter.

The peri-urban dimension of the energy problem lies in the fact that while people's access to conventional sources of energy is eroded as sources of fuelwood are converted to other purposes, this is not replaced by a matching improvement in the supply of modern energy services to which cities and urban centres have access.

IV. CONCLUSION

The peri-urban interface has been described as a "*…space crying out for attention*".[17] Shahpur Khurd and Karnera are two villages that highlight several characteristics of the peri-urban interface: a co-existence of rural and urban land use and practices; and a transition from agrarian to urban practices with the adverse environmental impacts involved. These case studies also highlight the critical linkage between urban centres and the villages and the need to strengthen these from a livelihoods perspective. Furthermore, they illustrate the strong existence of a two-way flow of goods and services between villages and urban centres and the need to protect and strengthen them.

17. See reference 2, page 134.

The analysis in both these case studies suggests that given the strong mutual dependence between the villages and urban centres, developing policy options for development in peri-urban areas requires explicit attention being paid to improving connectivity and transportation in order to strengthen rural–urban linkages. As demonstrated here, peri-urban livelihoods are constructed across both urban and rural spaces, and transportation has a role in bridging the rural–urban divide. This translates into an increased emphasis on intermediary transport between the villages and the towns. For peri-urban areas located along highways, such as Shahpur Khurd, this requires the creation of platforms for dialogue and coordination among different levels of government – village, state and national, and not just urban and rural, as is conventionally thought.

At the same time, there is a need to protect common property institutions on which the livelihoods of the poor and landless depend – and to which they lose access as they are converted to other uses. In both Shahpur Khurd and Karnera, the acquisition of common property resources – either through their takeover by the *panchayats* or by means of their conversion into urban uses and purposes – makes the landless more vulnerable and dependent upon those who have land for their supplies of fuelwood and fodder. Thus, the peri-urban interface creates clear implications for social and power relationships among peri-urban dwellers. An important policy challenge for the peri-urban interface lies in providing alternatives for the poor, who depend upon common property resources and who lose access to them in the process of their takeover for urban and industrial development.

Finally, siting and location norms can have an important role in improving the quality of life of people in peri-urban settlements. Places such as Shahpur Khurd and Karnera often serve as dumping grounds for industries that are relocating from bigger cities and towns because the urban periphery is less subject to stringent controls and regulations, or in a bid to create a healthy environment in the main cities. This creates

adverse impacts on the health and quality of life of peri-urban settlement inhabitants. Concerted action is required to prevent the relocation of factories to the boundaries of peri-urban settlements, which will call for strong social mobilization or political will, or, perhaps, both.

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