

# **ILLEGAL FACTORIES IN DELHI THE CONTROVERSY, THE CAUSES, AND THE EXPECTED FUTURE**

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## **ABSTRACT**

*In Delhi, environmental pollution has reached alarming levels. Industry is one of the most important causes. There over 100,000 mostly small unauthorised units located in residential areas: many of them highly polluting chemical, metal, asbestos, rubber, and plastic factories. Originally, these factories were established in and around urbanising villages, where the land-use regulations are less strict. Since, many of these industrialised villages have been incorporated into the city, and many slums inhabited by factory labour have mushroomed around it. Unhealthy conditions prevail where industry and residences are intermixed. Presently, the issue has ran into high controversy: the Supreme Court summoned the municipality to enforce the Delhi Master Plan, which previously was a sleeping document with little in common with reality, on removing industry from the urban areas. This has led to a slow and half-hearted effort from the government to ban the illegal industries without providing fair alternatives. This drive met stiff opposition from factory owners as well as labourers. The resulting riots even claimed lives. Meanwhile, nobody looks at the villages that are at the rural fringe of the city, facing increased unrestricted influx of factories. This neglect will cause the same undesirable mix of industrial and residential land when these villages will lie within the fast-expanding city. The authorities in Delhi will have to implement integrated policies for small-scale industry, providing enough well-serviced sites for small factories and enforce land-use zoning. This should be combined with housing for the (poor) labourer families at reasonable distance.*

## 1 OVERVIEW OF THE PAPER

The issue about the relocation of industries in Delhi has lingered for a long time. At the end of the year 2000, the Supreme Court ordered the closure and relocation of all 'non-conforming industries' operating in the urban area of Delhi. The attempt by the Government of Delhi to execute this order culminated into riots. How could it have come so far? Specific spatial developments explain this. Many of the illegal industries are located in and around urban villages. Therefore, in this paper, the informal and sometimes illegal way of land supply in and around villages is first highlighted. Two case studies are presented: one of the village of Gopalpur, the other on Samaipur. The former demonstrates very typical patterns of illegal occupation of land resulting into settlement of informal housing and factories, while the latter illustrates the extreme environmental stress as a consequence of industrialisation. The cases show how informal housing attracts informal industries, and visa-versa, and create an understanding about the issues on local level. Following this, the next section focuses on the political and legal affairs around the resettlement of industry. The paper further elucidates the expected course of future developments, taking the lessons from the past and witnessing the current developments in the rural areas just outside the city. It concludes with some policy suggestions. The facts and material in the case studies is based on primary surveys conducted as a part of a larger study (Bentinck, 2000) and another on going research by the second author. In addition, specific secondary information is collected from Indian newspapers and other publications.

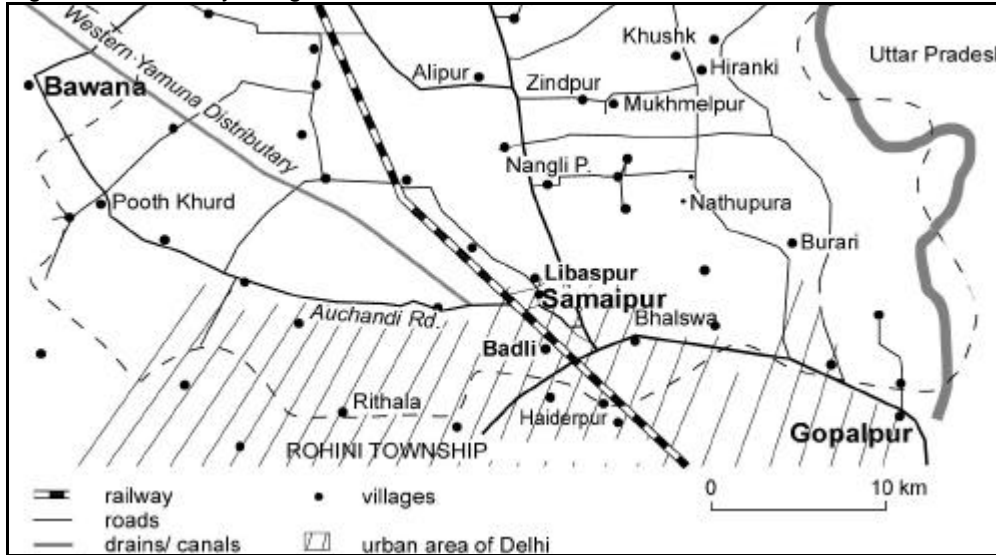
## 2 INFORMAL LAND SUPPLY IN VILLAGES

Delhi, with 14 million inhabitants, is growing at a rate of about four per cent per year. The city therefore experiences an extreme pressure on land. In the absence of affordable formal housing the poor resort to squatting public spaces, which develop into slums. Others live in rented accommodation in urban villages and informal settlements. The poor migrants are keen to save money on accommodation. Therefore, where possible, they tend to opt for a free or low-cost hut in a slum. An important element of the presence of these migrants is the cheap labour provided by them which is used in a wide range of sectors in the urban economy: they work as servants, washermen, people who iron clothes, garbage collectors, other sweepers, watchmen, rickshaw-pullers, repairmen etc. Local industry also requires labour, both for both day and night shifts. Considering these people's daily work and monetary budgets, it is hardly possible for them to commute long distances. Resettlement programmes for shifting the poor to more distant sites have therefore been largely unsuccessful.

Villages on the city's fringe have an important role in the provision of informal land supply. Their population too earns from land transactions, and find opportunity to build in and around their villages. Their freedom to do so is explained by the legal status of the village *lal dora* (the boundary of the village's built-up land), within which the land-use regulations are more relaxed than elsewhere. The *lal dora* legislation was meant to make residential land available to the villagers and to stimulate 'rural industry' while saving the agricultural land. Therefore, the land use restrictions and property tax charges are less within the *lal dora*. The value of the land covered by this regime can be very high, especially in places with good commercial opportunities. This land is also highly sought after by small urban entrepreneurs who run the type of industries that are not allowed elsewhere and who want to avoid paying taxes. When land acquisition from the government takes place, the area encompassed by the *lal dora* area is usually expanded to provide villagers with the opportunity to acquire more residential and commercial land (Hindustan Times 7-6-2000). This leads to an unplanned scramble for the most attractive

locations, without proper provision of amenities and infrastructure. Especially industrial and residential areas become strongly mixed, causing stress the limited infrastructure facilities and adverse environmental conditions, such as in and around the villages of Gopalpur and Samaipur.

Figure 1. The study villages at the Northern side of Delhi, India



Source: Bentinck 2000

### 3 ILLEGAL OCCUPATION OF LAND AND INDUSTRIALISATION: GOPALPUR

The first inhabitants of Gopalpur were migrants from the neighbouring state of Uttar Pradesh. They came to Delhi in search of a better livelihood. At first, they settled on government-owned land in Delhi, which was then vacant. However, in 1945, the British Government evicted them from the encroached land. As a result, they occupied the current place. Hence Gopalpur came into existence. Initially, there were only 4-5 households. This site was a flood prone area during the heavy monsoon and its inhabitants had to experience the hardship of shifting to other dry places for two to three months every year. In the late 1970s, the area around Gopalpur became the site of large infrastructure works. A wide seasonal drain was laid, a dam was built, and a new Ring Road was constructed close by. All this safeguarded the village from annual flooding, and gradually the place started to attract more migrants. Presently, Gopalpur counts around 1,000 households. The village is still situated on the edge of urban Delhi. Infrastructure of many kinds surrounds it: a large drain, highway, a power station, a sanitary landfill and a water treatment plant.

Recent in-migration has contributed significantly to the population growth of Gopalpur. As a result, the percentage of households residing earlier than 20 years has been way beyond surpassed by the number of migrant households. This village has four road exits; two that link it to the Ring Road that has a frequent bus service connection to almost all places in the city, the other two roads exits approach adjoining urban middle class residential areas. The proximity to urban Delhi, well-accessible location the availability of cheap rooms for rent, and relatively inexpensive land on sale at present are the main factors that contribute to the influx of many migrants to this village.

This village offers inexpensive options with regards to infrastructure facilities. Many large concrete water pipes that supply water all over Delhi criss-cross the village. Access to potable

water is not very problematic, as residents often crack the pipes to make water outlets. This ensures a steady supply of water without cost. The charges on electricity are also negligible due to the illegal tapping of the electric wires that extend over the village from the nearby power transformer. The lack of government enforcement on illegal occupation of land and free tapping of power and water supports a strong influx of migrants and factories to this village.

Over the time, the earliest residents have illegally taken possession of vacant village land located nearby their houses and on the edges of the seasonal water-drain. They have not let the opportunity of making quick profits pass by. Realising the growing importance of land in Delhi, they have sold and rented housing to the incoming migrants on large scale. This was formally government land, which if unguarded is notably vulnerable to illegal occupation. The land was therefore available on a relatively low rate. The absence of an official land title has not deterred incoming migrants to purchase it. Various types of housing ranging from shacks, straw-mud houses, and inferior type of brick housing sprang up around the village and in the dry drain bed. In due time, regularisation and official recognition of housing on encroached land is common in Delhi. Patronage from local politicians is very significant, which provides some degree of protection to illegal settlements<sup>1</sup>. Where each person is a potential voter in future elections, local politicians take up their issues. As a potential source of labour, the migrants have played a very important role in attracting informal labour-intensive factories in Gopalpur. In turn, the local factories continue to attract newer migrants in search of employment and cheap residence.

### **Factories in Gopalpur**

As with housing, Gopalpur also offers an attractive site for the location of workshops, factories and small storage houses. The availability of space at economical price, good access and linkage with the city's markets, and availability of cheap labour in the form of poor migrants residing nearby are clearly some advantages. Added to that, the availability of electricity, (often illegally tapped from overhead wires) and water (both pipe and ground water), and the lack of restriction on type of manufacturing especially encourages factories in this village.

Villagers, keen to make most money out of the illegally occupied government land, rent out the basic house-like structures for housing or factories. None of the factories that function in this area are registered. Some manufacture inferior quality products that mostly cater to the demand of poor sections of the society. Nevertheless, their significance in and for the village is undisputed. Most of them are small in size, employing between 5 to 15 workers. The types of factories include electrical spare parts, assembling of auto-spare parts such as car head lights, manufacturing and packing of seat covers for automobiles, wire-making, manufacturing plastic goods such as wrist-watch cases, plastic bags, and iron-smelting. Apart from the factories where work is performed within the premises, there is also noteworthy presence of piece-rate work that is sub-contracted to households in the village. This is mostly low-paid work such as channel and cassette assembling. Women belonging to poor migrant household carry it out on very low rates.

Many factories use illegal electricity connections, resulting in frequent power cuts. Further, due to totally absent solid waste disposal facilities, the discarded litter from the factories ends up in heaps along the streets choking the open sewer lines. In addition, the frequent transportation of unfinished and finished products from these factories in mini-trucks and three-wheelers leads to congestion and over crowding in the narrow and crooked by-lanes of the village. Water is also

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<sup>1</sup> For example, in August 1998 about 170 houses owned or rented by migrants in the dry drain-bed were bulldozed, but with political assurances, migrants continued to camp on the same site in the expectation of some monetary compensation or resettlement. Their persistence paid off: in early 2001 each household was allotted a small piece of land at another location.

often misused because of its free availability. Together with the absence of proper drainage, this creates stagnant pools of water all through the village, providing ideal breeding grounds for mosquitoes. Water-borne disease and infections are therefore very common. The village clearly illustrates that informal urbanisation, while providing work and a place to live for the urban poor, also results in the creation of slums and severe environmental degradation.

#### **4 ENVIRONMENTAL STRESS FROM ILLEGAL FACTORIES: SAMAIPUR**

This case study focuses on the adverse effects of the mix of residential and industrial land use. This leads to a variety of health problems, which is the most important reason for the current political row on resettlement of the factories. Figure 2 shows the location of Samaipur and its setting. Figure 3 depicts the surveyed part, where the respondents such as industrial owners, residents, doctors, pharmacists and other key informants were consulted. As the maps indicate, the residential, commercial, and industrial land uses are highly mixed as a result of illegal settlement of both industries and new settlers.

When visiting Samaipur, the smoke, the garbage, the filthy water in the open drains and stagnant pools, the noise level and the enormous number of people overwhelm the outsider. But the first impression does not tell the whole story. Studying the settlement for a longer time allows one to unravel the mechanisms to some extent and put many of the environmental problems in perspective. The treatment of these issues remains on a descriptive level, since tracing the causality between environmental factors and health is an extremely complicated and tricky issue.

According to Census figures, Samaipur became fully urbanised in the 1980s (Census of India, 1991). In 1971, it was still classified as a rural village; in 1981, it fell into in the category of a town; and in 1991 it was fully incorporated into urban Delhi. By now, all agricultural fields have disappeared in favour of commercial, residential and industrial uses. This study focuses on the village and its direct vicinity: the village; the squatter settlement Sanjay Colony, located east of the village; and the industrial area lying in between.

At present, the village itself has over 15,000 inhabitants. Besides, numerous 'colonies' have sprung up on what was formerly Samaipur's agricultural land. Agriculture as an occupation has nearly disappeared. Rarely are original villagers directly involved in manufacturing. Instead, they provide many services to factories (transportation, repair shops, other shops, etc.). Property-owning villagers have prospered by selling and renting out land and buildings. Even for those who did not own land, the income position has improved over the past 25 years, mainly because of obtaining a government job and being involved in the booming local commercial sector.

The slum settlement of Sanjay Colony houses around 6,000 people in 1,200 huts and small brick structures. Some are so small that not all of the residents can lie down to sleep at the same time. The one acre on which Sanjay Colony is built had been vacant land owned by the government until it was squatted by a small group of factory workers in 1985. By now, the population has grown so much that it is virtually impossible for the authorities to remove the settlement. Sanjay Colony 'benefits' from political patronage that until now has prevented its eviction. The name of the colony refers to Sanjay Gandhi, the deceased son of Indira Gandhi and member of the Congress Party. The choice of this name implies that the colony banks on that party for political backing. (Ironically, as part of the Indira Gandhi administration, the late Sanjay Gandhi was a notorious 'demolisher' of slums.)

Figure 2. The location of Samaipur at the urban fringe of Delhi

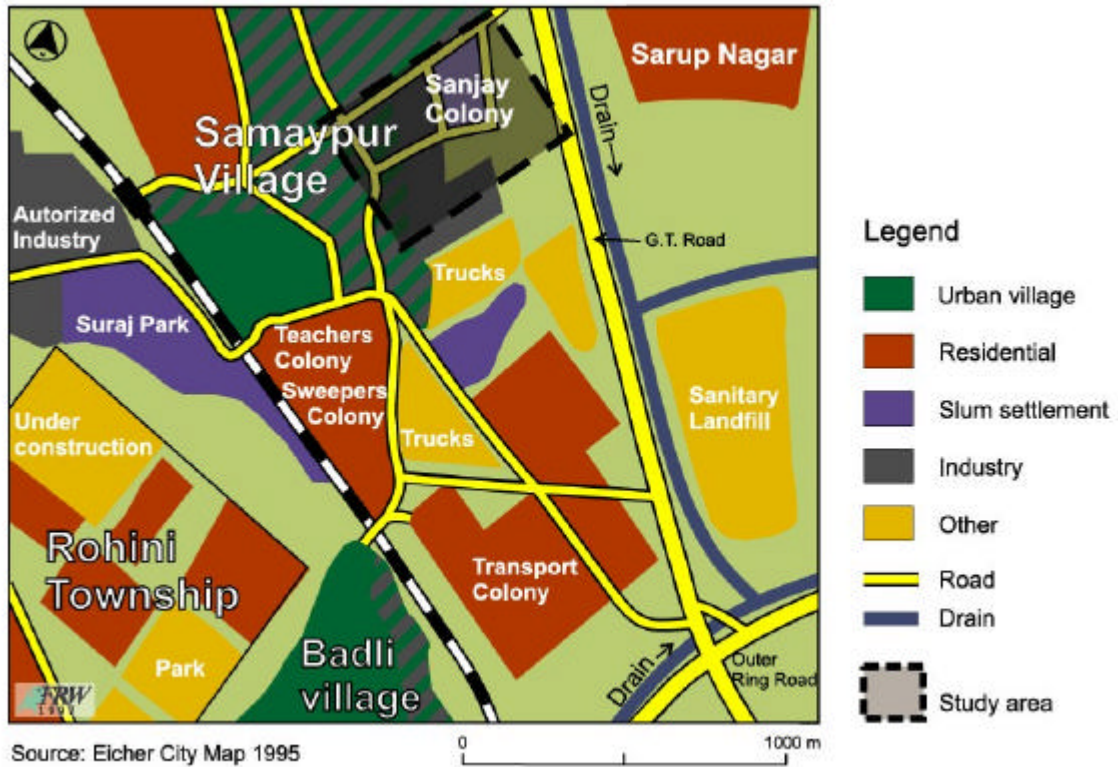
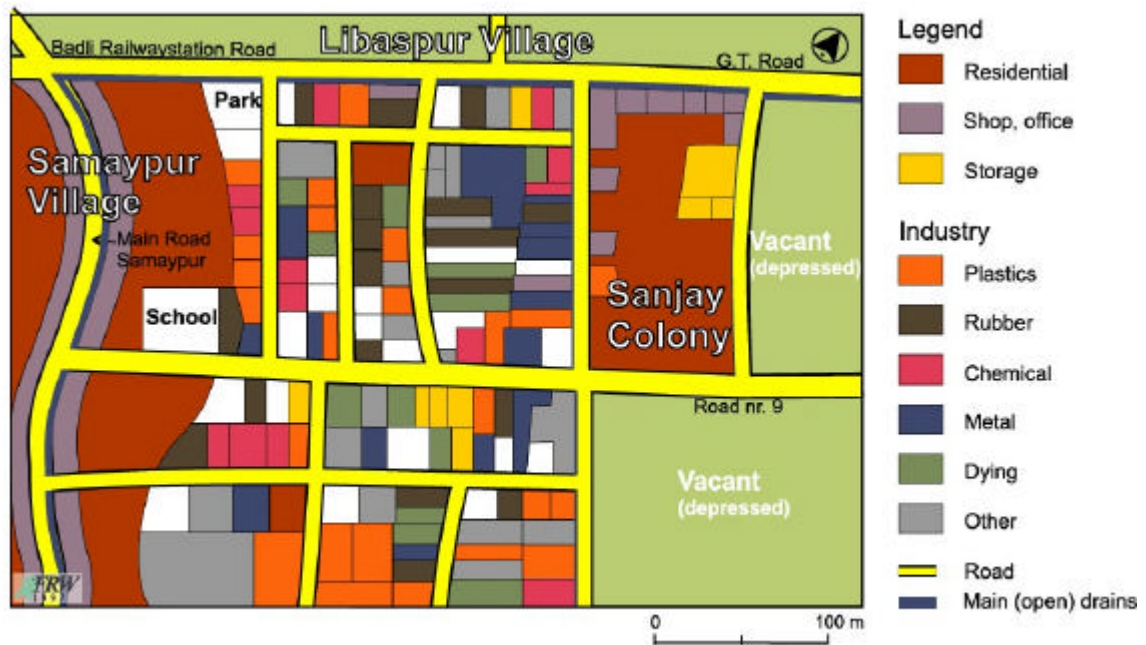


Figure 3. Land use in Samaipur, the industrial area and Sanjay Colony



The lower-lying land adjacent to Sanjay Colony is left unused while two different government authorities, the Transport Department and the Municipal Corporation of Delhi dispute the responsibility of levelling it. The impasse creates a precarious situation, jeopardising the health of nearby residents. Dirty water frequently collects there; factories and households dump garbage in this area; and it is used for 'nightsoil' by the slum population in the absence of toilets in the settlement. Insects breed there especially in the monsoon time. Waterlogging is also a problem within the settlement itself, where some slums are below 'street' level. More and more residents take steps to raise the ground level of their dwellings. Consequently, the situation for the remaining low-lying huts becomes even worse. Sanitary conditions are still poor, although the Municipal Corporation, supporting a local initiative, provided a simple half-closed sewer. The main problem is that during monsoon the sewerage flows into houses and into the stagnant pools.

Water taps are present, but not in the huts themselves. There are still too few of public water faucets, and people have to line up to use this facility. The hand-pumped water is of too poor quality to drink but can be used for washing. Electricity is illegally tapped from nearby wires. The continuing uncertainty about the legal status of Sanjay Colony does not give people much incentive to improve their housing conditions. Nevertheless, people keep constructing provisional second storeys on their huts, mainly to accommodate newly arrived family members and acquaintances. All the residents are migrants: the majority of them are young workers and their families from eastern Uttar Pradesh and Bihar.

The first industries settled in Samaipur in the mid-1970s. There are now 500 establishments, mostly small units, within the Samaipur village area and around 100 in the surveyed area depicted in Figure 3. Samaipur is part of a larger industrial area, comprising Badli (which has an unauthorised as well as authorised industrial area), adjacent Libaspur and Siraspur. In the total area, there are more than 1,200 manufacturing units, employing approximately 25,000 workers. Most industries produce relatively low-value goods for the domestic market. The location at the crossing of the GT Road and the Outer Ring Road makes the location attractive to factories that are closely linked with the many storehouses and transportation companies.

The flour and lentil mills are among the earliest industries that settled in Samaipur itself. Most of the initial agro-based factories still remain in the village. Adjacent to the village towards Sanjay Colony, there are many types of industry, though factories handling plastics (PVC and acrylics), rubber and metal predominate. There are two types of industry that deal with plastics. One type recycles used material (sometimes even imported from industrialised countries!) and turns it into grains that are used for making new plastic goods. The other type makes plastic products and often uses the same grains for e.g. household bags. Some factories make rubber products such as auto parts, slippers and mats. Factories working with metals include iron foundries and producers of small metal parts, usually made of iron and copper. There is a wide range of products: metal sheets, metal boxes, tools, nails, car parts and other engine parts. Some factories combine metal and plastic in manufacturing electric wires and cables. There are a few factories making asbestos roof sheeting. Other industries include textile dyeing, manufacture of paints and other chemicals, soap, wax, construction materials, and assembly of cardboard boxes. In addition, numerous workshops and repair services are scattered throughout the area, mostly run by local villagers. These are very closely linked with industries since they supply the required repair services.

The industries are owned exclusively by Delhi-based industrialists. But in about half of all cases, the compound is still owned by the original villagers who rent out the land. The intricate structure of the local economy gives wide scope to the informal sector. In reality, it is hard to distinguish between a formal- and an informal-sector activity. Even factories themselves might be counted as informal industrial activity. Since their activities are largely unauthorised, the capital intensity is

much lower than in 'formal' industry. Moreover, the machinery is old and much of the work is done manually by large pools of non-unionised labour. This mode of operation is in stark contrast with the large-scale (semi-)government-owned companies, the production facilities of large private companies in India, and multinationals. In spare parts for cars, scooters and machinery, consumers in India have a choice; they can buy the original parts or locally manufactured (copied) parts. The original parts are usually much more expensive, but the quality is higher. The local parts are produced in areas such as Samaipur. The machinery used by the factories is often second-hand and outdated, already written off by formal industry from many places around the world. Most production processes require a large input of labour. Even in very small factories, workers are employed in day and night shifts. Another clear aspect of the informal sector is the way it involves many rag pickers who bring waste plastics to the factories.

### **Environmental pollution and the effects on health**

*Air pollution.* There are three main sources of air pollution in Samaipur: first, combustion of fossil fuels and wastes in factories; second, emission during the process of manufacturing; and third, road traffic. The most serious air pollutants were identified as particulate matter (SPM), sulphur dioxide, suspended nitrates and carbon monoxide. The dominant wind direction carries the smoke to the east and northeast towards Sanjay Colony. Consequently, air pollution is worst in and near the factories and in Sanjay Colony, which means that the industrial labourers living in Sanjay Colony receive double exposure. The factory owners claim that they cannot do anything about without the provision of proper facilities by the government. They say they can only introduce emission control individually when the government gives them a legal status that ensures that their investments will not go waste.

*Water pollution.* Factories also cause the most serious water pollution. Dyeing of textiles, rolling and pickling units (washing of steel), acid baths and the production of many types of chemicals generate a discharge of fluid waste that has not been treated. The dyeing factories cause the most spectacular-looking water pollution. Not only is the waste water reported to be acidic; but it contains high concentrations of (heavy) metals such as chromium, copper, iron, cadmium, nickel and lead. The main problem arises from leaks and overflows of the sewerage system. During the monsoon, the drains frequently overflow and cause the polluted water to spread. Industrial wastewater seeps into the groundwater, polluting the water from hand pumps.

*Solid waste problems.* Households and industries generate different types of solid wastes. Household wastes are mostly organic and contain few toxic substances; industrial wastes are more dangerous. There is a garbage landfill site very nearby (see Figure 2), but not all garbage from Samaipur actually reaches that dump. There is no municipal collection of industrial waste. Consequently, all kinds of waste materials are swept out on the roads, heaping up on vacant plots. The exact contents of the industrial solid wastes are not known, but the many chemical factories as well as the use of asbestos make it likely that harmful contents are present. Especially children are vulnerable to diseases transmitted by uncollected waste, because they play out in the open.

*Other problems.* To an outsider, the noise level around the industries is maddening; it is also experienced as such by many of the local residents. A large part of the noise comes from the many industries that rely on power generators in case the electricity supply fails. Other machines also produce noise as well, notably those in the sheet-metal factories, in plants manufacturing tools and construction materials, and in the repair shops. The noise caused by the flour and lentil mills, which keep running day and night, is particularly bad inside the village. It has even been claimed that vibrations caused by machines are so severe that cracks are showing up in the walls of houses. In addition, the odour of industrial emissions and materials is obvious. Yet in view of the response of the local population, they have apparently become used to it.

Because of its industrial setting, the health situation in Sanjay Colony is even more precarious than in the 'usual' slums in developing countries. However, one should be cautious about supposing a direct link between the health of the residents and the state of pollution, congestion, and civic amenities (Geddes 1997, Wildavski 1995, De Lepper et al. 1995). One should be aware of analytical complications related with the mobility of the population, life-style factors, household hygiene and poverty. As for the relation with pollution and congestion, the following brief account of the health situation is mostly hypothetical, largely based on what local doctors, pharmacists and other key informants identify to be the health pattern of the population.

*Respiratory diseases* are rampant, although it is feared that they often go undiagnosed. Respiratory disorders are commonly connected with air pollution. Doctors and pharmacists identify *tuberculosis* as a major threat to health, especially among the migrant workers and their families. Air pollution and congestion are expected to be partly to blame. Climatic factors are also important; cold weather is unfavourable for (potential) tuberculosis patients. *Asthmatic problems* are reported to be on the rise as well. This is a phenomenon found in the whole of Delhi, but it is particularly serious where there are high concentrations of dust and pollution. *Bronchitis and silicosis* are also reported frequently; these diseases have known links to inhalation of fine dust particles from fly-ash (burnt coal), fine sand particles and suspended particulate matter (SPM). *Skin diseases* are found especially during the monsoon, coinciding with high humidity. Some chemicals are identified as causing problems to the skin of feet and legs when the sewerage overflows. Labourers who handle chemicals and are exposed to heat are especially vulnerable to exposure to chemicals that are harmful to the skin.

*Digestive disorders* occur frequently, particularly among the poorer sections. Stomach infections are normally caused by contaminated food, but work stress, exposure to chemicals and drinking of polluted water are other important contributing factors. (*Viral*) *fevers* are very common and often linked to contaminated water. *Dengue fever* – a rare disease transmitted by mosquitoes that breed in clear stagnant water, though it reached epidemic proportions in Delhi during 1996 and 1997 – made a disproportionately high number of people ill and caused a few fatalities, both in Samaipur village and in Sanjay Colony.

Other types of disease are of a more diverse nature. *Decay of teeth*, especially among factory labourers, is mentioned as one of the consequences of exposure to heat and chemicals such as acids, alkalis, nickel and silver. Similarly, *eye problems* are also frequently mentioned, sometimes as a result of accidents leading to blindness. In addition, heat-related diseases such as *nasopharyngitis* and noise-related afflictions such as *deafness* also occur among factory labourers. One would not immediately think of *psychological troubles*, *psychiatric diseases* or *depression* as obvious health hazards. Nevertheless, they are very widespread. Doctors mentioned mental problems as one of the main and fastest-growing complaints. They could be related to the environment through the effects of noise and extreme population density and congestion. Finally, accidents occur causing *physical injuries* of many kinds. They take place, especially in illegal factories. Injuries can cause permanent disabilities; fatal accidents are certainly not rare. Safety measures in the factories are not given any priority. The steel rolling mills are particularly hazardous. Injuries include burns, concussions, fractures and wounds.

## 5 THE CONTROVERSY OF RELOCATION OF FACTORIES

Acting on a long pending public petition filed in 1985 by lawyer M.C. Mehta, Justice Kuldeep Singh ordered for the closure of all hazardous industries from the residential areas of Delhi. In the petition, it was pointed that operation of such industries is in total disregard of the Master Plan of

Delhi (National Capital Region Planning Board, 1986), which explicitly mentions that industry could no longer be allowed in residential areas of Delhi (Times of India, 13-2-1996). As a consequence, in the first phase 168 'hazardous' large industries were ordered to close by the Supreme Court (Hindustan Times 9-7-96). In addition, another 762 polluting industries were identified and sent legal notices to close down their operations. In the following four years, this issue received less attention. However, in November 2000, annoyed Supreme Court Judges set a one-month deadline for closure of all polluting industrial units in residential areas (Ahmed et al. 2000). It banned all polluting industries from operating in 'non-conforming areas', including those in urban villages. This sparked the otherwise unorganised workers to go on rampage and riots. Buses were destroyed and crowds fought with the riot police, claiming three lives. After a few days, the situation calmed down but remained tense. Meanwhile, the Supreme Court demanded a list of polluting industries functioning in non-conforming areas from the government. This was followed by a hurried survey lasting 10 days by the Municipal Corporation of Delhi (Hindustan Times, 12-12-2000 and 18-12-2000). All this time, confusion over what comes under a 'polluting industry' continued. A list of 27 types of industries was made that were to be relocated, ranging from plastic recycling to chemical and iron foundry plants (Hindustan Times, 19-12-2000). Fearing court sanction, the Government of Delhi decided to close (or 'seal') all industries in this group until a solution could be worked out. In the meanwhile, the puzzle of which other industries were to be sealed led to complaints from the factory owners alleging wrongful and arbitrary sealing (Hindustan Times 20-12-2000). The lack of reliable ground information and corrupt practices added to the chaos (Hindustan Times, 12-12-2000). Also, many factories keep operating during night time (Times of India 19-2-2001 and 1-5-2001). Quite a few, however, already shifted or closed down operations, at least temporarily. Unemployment has hit the concerned areas, and many poor household are drawn into acute deprivation. Some people have moved away to unknown destinations.

Samaipur and Gopalpur are included in the Supreme Court verdict aiming to relocate the industries away from residential areas. After much political lobbying, most of non-residential part of Samaipur was declared a formal industrial area. The relocation became therefore limited to polluting factories that clearly intermix with residential areas. In Gopalpur many factories are not coming in the category 'polluting', but those that are, have largely been closed. At present, this issue remains unresolved. Further execution of the court order depends on the provision of a relocation site by the government, whose eagerness to tackle the issue has repeatedly been doubted.

A few years back, an area of 1,880 acres was acquired in the town of Bawana, about 10 kilometres from the city's limits (The Hindu 5-4-98). The development of this area as an industrial site is slow, and its merits are being questioned (Times of India 22-1-2000). The solution sought to create an enormous industrial site near Bawana (Figure 1) is problem-ridden. This plan does not include provisions to house labourers and their families. According to some estimates, more than 700,000 workers and their family members need to be relocated as well (Times of India 22-1-2001). If no provisions for housing are made, the emergence of new slum areas near Bawana seems inevitable. Furthermore, the alternative locations farther from the city may not offer the same locational, infrastructural and labour-market advantages as the informal enterprises enjoy at their current sites. Most of them are engaged in manufacturing inferior quality (often duplicate) consumer goods to the less well off sections of the society and their profit margins are largely based on above stated advantages. In addition, since the financial threshold for a factory owner to enter the new site is high, there is also a possibility that along with the newly authorised industry, unauthorised industries will settle in nearby (village) sites as well.

Even at the places where factories have been removed, the existing factory premises are often re-used for industry, because of the location it is difficult to assign a different use to it, and the owners are keen to rent them out. Other villagers also depend heavily on providing ancillary services, and do not like to see the factories leave either. From the government's side; as long as poor ground information, corrupt practices in bureaucracy, and short-term policies in the government prevail, the chaotic state of affairs is far from finished.

## 6 THE FUTURE OF URBANISING VILLAGES

For anticipating future developments, it is interesting to look at the villages still outside the city's limits. These largely 'escape' the Supreme Court's verdict. Ground verification in March 2001 confirmed that factories remain in operation (although with locks on their front doors) in many of the 'rural' villages. Recently, the *lal dora* of most villages have been officially extended, providing more scope for factories to settle there (Hindustan Times, 7-6-2000). If the policy is extended to the whole of Delhi, the factories also may seek similar sites in and adjacent to the villages in the surrounding states of Haryana and Uttar Pradesh.

The disregard of policies and spatial planning for the micro-level situation in villages prevents proper zoning to separate between industrial and residential land use. Rather than making very ambitious plans, the government should provide tailor-made solutions for smaller areas, taking use of the capacity in villages to execute construction activities and provide housing to labourers. The government can then focus on servicing the area, providing proper infrastructure, create zoning between residences and factories, and make sure they feed new plots into the tax net. It seems unlikely that with the current plans the government can satisfy the growing demand for new industrial sites conform the directions of the judiciary. In an area like Samaipur, all unwanted factories will have to be moved in a short period of time and an alternative use should be sought for the vacated land. Another concern is the enormous loss of revenue from rents and jobs for the villagers. In planning the relocation of industry, there seems to be too little awareness on the part of the authorities of the enormous demand of such industries for (housing for) labour and ancillary services.

It is evident that the realm of policy and administration fails to recognise the rural-urban fringe as an area with unique features that need specific policy measures (as claimed by Hill 1986 and Ginsburg et al. 1991). The information systems, land records, and revenue systems are inappropriate and outdated remnants of a rural past. For example, the village *Patwari* (land registrar) is trained to register rural land titles and crop patterns, not factories and unauthorised colonies. Precise and well-accessible land records will decrease the scope for manipulation and disputes on land. Besides, in an effort to avoid undesirable mix of land uses in the villages should embrace the lessons from the past. Creative local level land-use planning should take into account the specific spatial and socio-economic situation of urbanising villages. This to avoid the creation of new Samaipurs and Gopalpurs.

## 7 REFERENCES

- AHMED, K, C. KHANDUJA AND N. SETHI, Master Plan for anarchy, Down to Earth, vol. 9, no. 15, December 31, 2000.
- BENTINCK, J.V. (2000), Unruly urbanisation on Delhi's fringe- changing patterns of land use and livelihood. *Nederlandse Geografische Studies* 270. Utrecht/Groningen: Royal Dutch Geographical Association/Faculty of Spatial Sciences, University of Groningen.
- GEDDES, R., ed. (1997), *Cities in our future: growth and form: environmental health and social equity*. Washington D.C: Island Press.
- GINSBURG, N., B. KOPPEL & T.G. MCGEE, eds. (1991), *The extended metropolis, settlement transition in Asia*. Honolulu: University of Hawaii Press.
- HILL, R. (1986), Land use change on the urban fringe. In: *Nature and Resources*, 22 (1-2), pp. 24-33.
- LEPPER, M.J.C. DE, H.J. SCHOLTEN & R.M. STERN, eds. (1995), *The added value of geographical information systems in public and environmental health*, Dordrecht: Kluwer Academic Publishers.
- NATIONAL CAPITAL REGION PLANNING BOARD (1986), *Delhi Master Plan 2001*. New Delhi.
- WILDAVSKY, A. (1995), *But is it true? A citizen's guide to environmental health and safety issues*. Cambridge: Harvard University Press.

### **Newspaper articles**

- HINDUSTAN TIMES 9-7-1996 SC orders 168 Polluting units to shift from Delhi
- HINDUSTAN TIMES 16-9-1998, Relocation of polluting factories begin
- HINDUSTAN TIMES 7- 6-2000, Rural residential limit to be extended
- HINDUSTAN TIMES 18-12-2000, MCD survey lists 75,000 non-conforming units.
- HINDUSTAN TIMES 19-12-2000, 321 units sealed, but confusion over polluting ones continues
- HINDUSTAN TIMES 20-12-2000, 321 units sealed, but confusion over polluting ones continues
- HINDUSTAN TIMES 12-12-2001, Sweepers carrying out survey of polluting units
- 
- TIMES OF INDIA 13-2-1996, SC pulls up officials for failure to check polluting units
- TIMES OF INDIA 22-1-2001, Development plans of Bawana progressing very slowly
- TIMES OF INDIA 19-2-2001, Shahdara residents complain as sealed units operate illegally at night
- TIMES OF INDIA 14-3-2001, Confusion still prevails over desealing order
- TIMES OF INDIA 1-5-2001, Units closure did not help electric supply
- 
- THE HINDU 5-4-1998, Project to relocate industries launched