Chapter 1

INTRODUCTION

Statement of the problem

Indoor Air pollution is a significant health hazard all over the especially in developing countries. It is "probably the greatest environmental hazard faced by women" (WHO, 1984)\(^1\). It plagues not only the rural areas but also the urban scene. In the urban areas indoor air pollution is of different nature with different economic strata. Though naturally associated with pollutants, the nature and the type vary. It can be a result of indoor cooking with low quality fuels on one hand; it can also be associated with pets, air conditioners and carpets on the other.

Whatever be its cause, Indoor Air Pollution is a major initiator of Acute Respiratory Infections or ARI. ARI involves a gamut of diseases which a person does not easily associate with indoor air pollution. For example pneumonia is usually linked with cold but that Indoor Air Pollution is also a major cause is often not realised by the common man. This unawareness often increases the severity of the problem as curative care is not successful unless preventive care is taken. Thus the diseases under ARI range from breathless and fever to Pneumonia and Asthma to finally Lung cancer and death.

Acute respiratory infections resulting from cooking smoke (an important source of indoor air pollution) is a very serious concern in the lower economic

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\(^1\) WHO, (1984), 'Biomass Fuel Consumption and Health', EFP / 84.64, Geneva.
masses. These people being restricted by their means resort to using traditional fuel for cooking e.g. vegetable peel, wood shavings etc. The combustion of these materials emit a lot of pollutants in the air, which, unless well diffused in the air lead to ARI. This problem is further compounded when they cook indoors. This is the way of life in most slums were there is so little space between the hutments that cooking outside is not an option. More often than not these structures have no proper ventilation for the smoke to escape thus trapping the pollutants inside; the houses are almost stuck to each like an extension of a limb thereby nullifying the option of atmospheric diffusion also. The slums, therefore are a hive of diseases among which ARI features largely.

Differences in gender roles result in differential exposures to cooking smoke among males and females. Moreover gender differences in nutritional status, treatment and care, as well as genetic and biological differences between the two sexes, resulting differential effects of these exposures on males and females essentially because it's the women who cook and men go out to work. There are significant questions linked to exposure to biomass or coal stove. Depending on the type of housing, fuel stove, ventilation and cooking patterns, exposure to particulates and gases found in biomass and coal smoke can be very high.

Hence the present study intends to focus on a few aspects of the effects of indoor air pollution, such as:

a) Effects of indoor air pollution (IAP) from cooking smoke on health in slums of Delhi.

b) Examine the effects of cooking smoke on Acute Respiratory Infections (ARI) among women and children below three years of age as a response to the exposure to polluting emissions.

As direct fallout of the household use of unprocessed biomass fuel, concentrations of health-damaging air pollutants tend to be highest indoors. Here biomass fuel such as wood, animal dung and crop residues as well as
plastics are burned for heating and cooking. This is contrary to the belief that air pollution in urban areas is mainly associated with vehicular motor vehicles and industries. These fuels will continue to be a primary source of heating and cooking in the slum households in the foreseeable future till, they will be able to break the vicious circle of poverty. As a result the World Bank has designated IAP resulting from cooking and heating with traditional fuels, as one of the four most critical environmental problems in the developing countries (World Bank, 1992)²

ARI Situation in India

In India, as in many other developing countries, ARI is the leading cause of childhood morbidity and mortality (MOHFW, 1998)³. According to the there National family Health Surveys, one in every five children under age three suffered from cough and one in every fifteen suffered from ARI – defined by a cough accompanied by short, rapid breathing – during the two weeks before the survey. For India as a whole this latter proportion translates into approximately 4.6 million ARI cases among children below age three during the two-week period. Also according to the NFHS, boys in India are more likely to suffer from ARI than girls.

India has not only high rates of ARI but also a high proportion of households that use some form of biomass as their primary cooking fuel. In the NFHS about three-fourths of the households reported unprocessed biomass as their major source of energy for cooking food. Cooking in India is often done under poorly ventilated conditions using inefficient stoves that produce a great deal of smoke such stoves are no more than a 'chulha'. To a considerable extent, life revolves around the cooking area and women, in particular, spend much of their time exposed to cooking smoke this leads to high levels of cooking

smoke exposures to women, young children and the elderly who typically stay indoors.

Therefore indoor air pollution is found to be potentially a serious environmental and public health threat in India. In poor communities, with the continuing trend in bio-fuel consumption coupled with deteriorating housing conditions, the problem will remain for some time to come. While to some extent the problem has been studied in rural areas, there is a dearth of reliable knowledge about the situation in urban slums. Urban slums are additionally exposed to pollution from industrial and vehicular sources, as they are commonly located near to factories and major roadways. Thus it would appear that the urban slum community bears the largest air pollution exposure burden.

Scheme of the Study

- Slums - residents are mostly BPL
- Type of housing e.g. no of rooms
- Time activity budget i.e., over 24 hr
- ARI / ALRI (Incidence, frequency, duration, severity)
- Personal exposure
- Emission of pollutants
- Spatial dispersion of pollutants
- Household energy technology e.g. type of stove
- Socio-economic condition of the urban slums

RSPM, CO
*Kitchen, living room etc

Role of energy policy, slum policy & Health policy
The Objectives of the Study

The study attempts

i) To examine the exposure pattern in the slums arising from contact to different categories of cooking fuel emissions.

ii) To examine the effect on health with special emphasis on the morbidity pattern of ARI among the slum dwellers arising from exposure to bio-fuels.

iii) To examine the gender differential pattern of ARI among the children and women

iv) To find out the exposure – response relationship between IAP and ARI.

v) To examine the current energy policy of the government in relation to the urban poor focussed on different types of cooking fuel and methods in the light of the draft Slum Policy.

Hypothesis

i) Incidence of ARI is higher among the slum dwellers compared to other diseases under the scope of investigation

ii) It is prevalent among male children (below 3yrs) compared to female children (below 3yrs)

iii) Across households, SES is a differentiator with respect to suffering from ARI.

iv) Kusumpur Pahari being economically better off has lesser incidence of ARI.

v) Switching to cleaner fuels would lead to cost benefits for the slum dwellers considering internalisation of other associated costs apart from direct costs.
Concepts and Definitions

Classification of Disease

For a more specific classification of diseases, this study borrows the basic outline from ICD 10 classification\(^4\). According to ICD 10, any disease is not characterised by the disease itself but by a combination of the disease and the exposure, as well as by the association between these two. It has curved out a broad outline of classification with several sub groups and sub systems and travelled deeply from the general to the particular disease symptoms. The broad outline is as follows:

1. *Diseases caused by agents*
   1.1 Diseases caused by chemical agents
   1.2 Diseases caused by physical agents
   1.3 Diseases caused by biological agents

2. *Diseases by target organ*
   2.1 Respiratory diseases
   2.2 Skin diseases
   2.3 Musculoskeletal diseases

3. *Cancer*

4. *Others*

The classifications contain both categories defined by the causative agent and categories defined by the medical diagnosis. Cases of a given disease may therefore fall into several categories. The absence of unified diagnostic criteria, coding system and classification reduce the compatibility and comparability of different symptoms of diseases and health surveys.

The main problem faced by independent surveyors and researchers of public health is that they are unable to classify the specific causes. There is no binding that only one particular source of disease will always specifically lead

to a certain disease. For example, Asthma can be caused by exposure to grain dust, pollen as well as vehicular and non vehicular pollution, tuberculosis can be caused by abattoir work, veterinary work as well as damp unhealthy living conditions. Therefore, for this study the diseases have been broadly classified into

Certain infectious and parasitic diseases

Neoplasms

Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism

Endocrine, nutritional and metabolic diseases

Mental and behavioural disorders

Diseases of the nervous system

Diseases of the eye and adnexa

Diseases of the ear and mastoid process

Diseases of the circulatory system

Diseases of the respiratory system

Diseases of the digestive system

Diseases of the skin and subcutaneous tissue

Diseases of the musculoskeletal system and connective tissue

Diseases of the genitourinary system

Pregnancy, childbirth and the puerperium
Certain conditions originating in the perinatal period

Congenital malformations, deformations and chromosomal abnormalities

Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified

Injury, poisoning and certain other consequences of external causes

External causes of morbidity and mortality

This too, is rather a broad classification and the problems of overlapping of diseases still remain wherein it becomes slightly difficult to separate diseases from one another especially for a non clinical person engaged in public health research. Therefore this classification is shortened into the following:

1) Diseases of the respiratory system
2) Mental and behavioural disorders
3) Diseases of the nervous system
4) Diseases of the circulatory system
5) Certain infectious and parasitic diseases e.g. water and vector borne
6) Diseases of the digestive system
7) Diseases of the skin and subcutaneous tissue
8) Diseases of the musculoskeletal system and connective tissue
9) Diseases of accidental nature
10) Diseases of the blood forming organs – Cardiac

11) Diseases of the eye and adnexa

12) Pregnancy, childbirth and the puerperium

13) Others

Data Definition

**Acute Respiratory infections (ARI):** Worldwide, there are no uniformly accepted criteria and the definitions in use are not are fully consistent. This study utilizes the WHO definition which defines ARI to include any combination of the following symptoms: cough with or without fever, blocked or runny nose, sore throat, and/or ear discharge with infection of the lungs and pneumonia being the most serious forms (WHO, 1991)\(^5\).

**Fuel type:** Fuel type refers to the sources of energy used for cooking, heating and lighting. For the purpose of this study, fuel type refers to the *main* type of fuel used in the households. It is essentially of three types – biomass (includes wood shavings, vegetable peel, dung, coal), kerosene, gas and others (this includes, plastic, rubber, paper and anything combustible).

**Age:** Age refers to the period from the time the child was born to the time when the questionnaire was administered. For the adults, it is the age that is reported by them.

**Sex:** Sex refers to the gender of the target sample population.

**Housing conditions:** This refers to the building materials, ventilation and crowding factor.

Location of the kitchen: This is a dichotomous variable having two characters, e.g. kitchen attached or separate from the house.

Socio-economic Status: SES (includes three variables eg education, major source of income and caste). There are four types of SES categories – SES1 – st and having the worst condition, SES2 – 2nd class and a moderate condition, SES3 – 3rd and good condition and SES4 – last class and has the best living conditions. Though slums in general have a very low SES, this classification is within that abject status.

Situating the study
Air pollution has become a major concern in India in the recent times both because it is now clear that large parts of the Indian urban population are exposed to some of the highest pollutant levels in the world and also because new studies around the world on the health effects of air pollution have increased confidence in estimates of the risks posed by air pollution exposures. In the last decade, a number of quantitative epidemiological studies of specific diseases have been undertaken that allow for the estimation of total burden of disease (mortality and morbidity) attributable to solid fuels in adult women and young children, who jointly receive the highest exposures because of their household roles, in Latin America and in South East Asia. Few studies are available yet in this light in India. What ever study is there pertains mostly to the rural India and its women and children and a few situated in urban India. The slums, which happen to be at a most vulnerable situation environmentally seems to be sadly neglected.

For the women a severe form of ARI associated with bio fuel smoke is Chronic Obstructive Pulmonary Disease (COPD) and Cor Pulmonale. A number of studies have looked into chronic respiratory ill health in women cooking with open biomass stoves and found a direct linkage between the two. Yet these
studies have been undertaken mostly for rural women. These studies have found severe impairment of lung function, cough and various other respiratory conditions associated with biomass smoke exposure among women.

In India, where sons are preferred over daughters and where the status of women is lower, health problems are less likely to be reported for women. This may lead to an impression that the problem is less serious among women than it actually is, particularly more so for the slums. This differential underreporting is more likely to occur among less educated women and among women living in biomass-fuel-using households. Not only the health problems in women and girls are less likely to be reported but also reported later when their problems reach a more acute status. And, when sick, women and girls are less likely to receive proper medical attention, which may aggravate their situation and lead to more permanent damage or higher mortality. Such discrimination against women and girls are more likely to be greater among biomass-fuel-using households than among cleaner-fuel-using households.

As women do most of the cooking and spent more time indoors, they are exposed more to the pollutants and are believed to have greater adverse health impacts. Young children who usually stay with their mothers indoors also have elevated exposures. Yet, there are few studies that differentiate exposure to indoor air pollution by sex and still fewer that examine the effects on the two sexes separately. Most studies start with the assumption that women have higher exposures and greater health impacts than men. IAP studies on children often include both boys and girls but do not study the exposure effects separately. Moreover, exposure is usually measured using proxy variables such as type of cooking fuel used in the households, which does not allow sex – desegregations of exposure data.
Availability of quantitative exposure information is a crucial requirement for assessment of associated health risks. Determination of 24-hr averages (for which health standards exist for outdoor areas) has been thus far attempted in very few studies. Initial studies determined. Some studies have been carried out for determination of concentrations for particulates and other pollutants, including CO, SO₂, and NO₂. Most studies point out that particulate matter is a good surrogate for overall indoor pollution levels associated with biomass consumption. Studies that monitor for 24 - hr concentrations and exposures are difficult to conduct and usually very resource intensive. At the same time there is little understanding about the different factors that affect exposure to indoor air pollution and their interlinkages i.e. to what extent fuel use patterns or housing characteristics are responsible for household air pollution concentrations. In addition, while a number of studies with IAP measurements have been undertaken in rural India, very little information on exposures in urban slums is currently available.

**Database**

**Secondary Data**


ii) NFHS surveys I and II


iv) Daily exposure to Air pollution in Indoor, Outdoor and In-vehicle Micro-environments: A pilot Study of Delhi. East-West Centre Working papers, Environmental Change, Vulnerability and Governance series
Primary Data & Field Surveys

v) Information on secondary indicators of IAP - household level exposure determinants has been collected by primary surveys.

The Plan of the Study

Objective (I)

To examine the exposure pattern in the slums arising from contact to different categories of cooking fuels smoke.

To fulfil this objective I have observed the daily pattern of activity of the women and the children. It starts from 5:30 in the morning and continues till the householders are in bed at night. From here I have derived my 24hr activity pattern, which would give the total exposure time to cooking smoke of each individual especially the women and the young children.

Broadly, the activities involved in the exposure assessment include the following

\[
Average\ 24\ Hour\ Exposure = \frac{K1 \times T1 + L1 \times T2 + O1 \times T3}{(T1 + T2 + T3)}
\]

\[
\text{Avg}\ 24\cdot hr\ exposure = \frac{K1T1 + L1T2 + O1T3}{(T1 + T2 + T3)}
\]

Where

- \(K1\) = 24hr avg concentration in the kitchen
- \(T1\) = Total time spent in the kitchen
- \(L1\) = 24hr avg concentration in the living area
- \(T2\) = Total time spent in the living area
- \(O1\) = 24hr avg concentration outdoors
- \(T3\) = Total time spent outdoors

And \(T1 + T2 + T3 = 24\ hrs^6\)

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The above methodology is applicable only where the households have more than one room with one room acting as a kitchen but in slums very few households have such facilities. Usually they consist of one room only with no separate kitchen and some times they have a kitchen with a partition. In both the cases they are treated as one room as pollutants can move freely even if there is a partition. In this case the method does not include $L_1$ and $T_2$. Instead time is divided between $T_1$ and $T_2$ and concentration of pollutants is attributed totally over $K_1$.

The changed equation is presented below,

$$\text{Average 24 Hour Exposure} = \frac{K_1 \times T_1 + O_1 \times T_3}{(T_1 + T_3)}$$

$$\text{Avg 24-hr exposure} = \frac{K_1 T_1 + O_1 T_3}{T_1 + T_3}$$

<table>
<thead>
<tr>
<th>Micro-environments</th>
<th>RSP ($\mu$gm/m$^3$)</th>
<th>CO (ppm/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooking</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>LPG</td>
<td>890</td>
<td>6</td>
</tr>
<tr>
<td>Kerosene</td>
<td>1160</td>
<td>3</td>
</tr>
<tr>
<td>Wood</td>
<td>1370</td>
<td>80</td>
</tr>
<tr>
<td>Coal</td>
<td>1090</td>
<td>96</td>
</tr>
<tr>
<td>Outdoor</td>
<td>280</td>
<td>3</td>
</tr>
<tr>
<td>Bedroom (sleeping)/Living room</td>
<td>640/810</td>
<td>19/12</td>
</tr>
</tbody>
</table>

Objective (II)

*To examine the effect on health especially the morbidity pattern among the slum dwellers arising from exposure to bio-fuels.*

For this objective I have determined various respiratory problems that the population has especially for the last two weeks and two months i.e. to examine whether the problem is still in the nascent stage (2wks) and
therefore can be contained by taking local medication or whether it has reached the chronic stage where a hospital consultation is necessary.

Some of the symptoms of ARI that commonly prevail and are often neglected, which often give rise to severe problems later on are:

- a) Conditions of wheezing or whistling in the chest
- b) Shortness of breath
- c) Tightness in the chest in the morning
- d) Coryza/cold (viral)
- e) Middle ear infection (bacterial – influenza)
- f) Tonsillitis (viral/bacterial)
- g) Diphtheria (bacterial)
- h) Laryngitis (croup)
- i) Measles
- j) Tracheo-bronchitis (viral/bacterial)
- k) Pneumonia
- l) Asthma

Objective (III)

*To examine the gender differential pattern of all diseases with special emphasis on ARI among the children and women*

The results of Objective I and objective IV will also have to computed at a gender level. Calculation of morbidity rates

Number of episodes of illness reported at the time of survey / the sample population * 1000

Computed for both acute and chronic forms of disease

Objective (IV)
To find out the exposure – response relationship between Indoor Air Pollution and ARI.

This encompasses a concretisation of the relationship between ARI and IAP. I have set up regression models between the different levels of exposure. The exposure levels that have been arrived at by fulfilling the first objective would be classified or divided into four groups:

i) high exposure  ii) moderate exposure  iii) low exposure  iv) no exposure (this includes family members using LPG and members who are away from home).

then I have resorted to simple regressions between the different symptoms of ARI and the exposure levels by the following method


i.e  \( R = f(e) \) where response is a function of exposure

iii) Logit regressions are used to determine the level of response to the exposures

Objective (VI)

To examine the current National Energy, Slum and Health Policies of the government in relation to the urban poor in the context of environment, women and ARI in concerned.

For this objective I have to drawn upon the conclusive findings of the other five objectives.

It is due to the lack of regular check ups that the ARI is allowed to get out of hand thus resulting in mortality. Moreover, the women in the slums are associated with large under-reporting where their illnesses are concerned due to lack of adequate attention. Also awareness levels of health and hygiene among the slum dwellers may need to be improved. Even if they are aware
they do not have the access to basic services and the finances, thus they are unwillingly forced to stay in an environment which might affect them. The use of biomass fuel results in high emissions of pollutants leading to ARI. This incurs a heavy economic burden on the family. As far as the cooking fuel and the resulting environmental hazards is concerned the government has different programmes, which mainly targets the rural areas and not the urban populace living below the poverty line. The government also has a Housing and Habitat Policy, which is expected to advocate the improvement of sanitation and housing conditions of the urban poor yet it too lacks concretisation. The Slum Policy does not mention about control of ARI, which happens to be such a major threat, after TB, to the slum dwellers. Finally the Health Policy mentions different illnesses and their control and about fulfilling the targets set, yet there happens to be no mention of ARI and what should be done to control it especially among the urban poor whose purchasing power limits them to the use of bio-fuels.

Each policy and each programme has been examined in the light of the findings of the objectives. As such the Government of India did not have an energy policy for a long time it is only in mid 2006 that the Integrated Energy policy has been released by the Planning commission. Various subsidies options have been examined. The present fuel situation will be looked into from the point of view of the access of the poor to clean fuels. Most of these programmes are aimed towards the rural poor.

**Organisation of the Study**

The chapter plan tries to follow the pattern in which each objective has been studied. It has not always been possible to segregate the objectives chapter wise as findings from more than one chapter has been used to fulfil one objective or findings from all chapters were required to satisfy a single major one:

The chapter plan is as follows:
The introduction contains the statement of the problem, the objectives and how they would be satisfied, situation and need of the study of the study and the a socio-economic and demographic profile. Then Chapter 2 gives the background and theoretical framework and finally an overview of literature pertaining to indoor air pollution and its effect on ARI. Chapter 3 deals with the aspects of morbidity in the sample slums, looking into the morbidity arising from both ARI and other diseases. The Information is broken down by sex and age groups to understand the pattern of morbidity. Chapter 4 is all linkages between acute respiratory infections and cooking smoke. This chapter gives a detailed idea of different aspects of indoor air pollution, vis-à-vis its components. Then it goes on to establish the relation existing between them and ARI. Chapter 5 is a critique of the existing energy, health and slum policies. This chapter looks into the costs that are incurred by the slum dwellers, essentially different health costs and how they can be redressed by a change in the government's policies. This is followed by the Chapter 6 which sums up the thesis giving a summary of Conclusions

**Characteristics of Households in the Slums Surveyed**

Households are not just tenements; they embody the life and soul of the people living in them. They represent the various aspects of life that goes into making a home. They characterize the households' social economic and demographic status. Households in the slums are different from those that are seen in the other areas of urban setting. They constitute the most important and persistent problem of urban life; they are the chief sources of crime and delinquency, of illness and death from disease. Sociologically, it is a way of life, a sub culture with a set of norms and values, which is reflected in poor sanitation and health practices, deviant behaviour and characteristic attributes of apathy and isolation. People who live in slum areas are isolated
from the general power structures and are regarded as inferior and they in
turn harbour suspicions of the outside world.

Significantly, in spite of substantial amount of literature available on urban
planning and problems in the country, it becomes difficult to spell out a
definition of slums in clear terms. Various authors, Commissions and Acts
define such locations differently, often in a broad and unclear fashion. For
example, the Maharashtra Slum Areas Act, 1971, define such pockets as 'any
area in the state which is unfit for human habitation'. According to the
Commissioner of Madras Corporation (1961), 'a slum is taken to mean
hutting areas with squalid surroundings. In such areas huts are erected in a
haphazard manner without proper access. Minimum basic amenities are
lacking in these areas. Protected water supply and drainage arrangements do
not exist in these areas'. Some studies dealing with slums in Delhi, categorize
such areas into Katras and Bustis. A Katra is defined as 'a group, usually of
single room tenements constructed normally in rows to capacity, within a
compound or enclosure having a single common entrance'. A busti is defined
as a 'thick cluster of small kachcha houses or huts built on open land in an
unauthorized manner'. Bombay has three types of similarly degraded housing
conditions, viz. (i) chawls; (ii) patra chawls; and (iii) jhopadhetties. Chawls
are multi-storeyed buildings built long ago as workers' colonies according to
the then prevailing standards but have now quite deteriorated. Patra chawls
are less permanent structures, authorised as well as unauthorized built often
with tin sheets or such similar materials. Jhopadhetties are squatter
settlements consisting of a large range of units constructed out of a variety of
materials for roofs and walls including asbestos, rags, packing boxes,
stretched drums, tin-sheets, mud and bricks. In Calcutta such localities are
known as bustees. Defined as in the city Municipal Act it is an 'area of land
occupied by any collection of huts on a plot of land not less than 1/6th of an
acre'.
Given such various sets of meanings, it appears that the definitions have been varying, based mainly on (a) the purpose; (b) the context and (c) the time of the study. Importantly, however, albeit in a somewhat loose fashion, three common attributes that characterize such areas are, (i) those that refer to specific human geographic spaces or situations and not to isolated physical units; (ii) those which are also identified by a combination of physical attributes and not with reference to any one single attribute and (iii) the ones that exist with a considerable range of variations with regard to the manifestation of each one of the physical attributes, significant among which are substandard houses, high density and congestion, excessive and disproportionate load on amenities, unhygienic conditions and often absence or serious lack of services like protected water supply, electricity, drainage, sewerage and clearance of garbage.

Choice of sample area

Two slum areas have been surveyed for the purpose of this study; they are Kusumpur Pahari and Shahadra. These slums were essentially chosen on the basis of their location and the level of exposure to outdoor air pollution. Kusumpur Pahari happens to be located in a relatively low pollution zone, adjacent to the posh locality of Vasant Vihar in South Delhi. The slums in Shahadra have a high exposure to vehicular pollution and industrial forms of outdoor air pollution. Though they are, in almost all the cases surrounded by tall buildings, that often act as barriers to outdoor pollution yet there is a high chance of mixing. The samples in both these slums have been chosen rather carefully based in the requirements of the study. Majority of the households have children below five years of age.
b) to understand the inherent differences that have resulted, maybe, from their different locations

This section attempts to provide an insight into the sample households surveyed in the two slums in two different areas of Delhi.

Table 1.1

<table>
<thead>
<tr>
<th>SLUMS</th>
<th>Distribution of Sample Households According to the Slums Surveyed</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Households</td>
<td>Total no of Males</td>
<td>Total no of Females</td>
<td>Total Population</td>
</tr>
<tr>
<td>Kusumpur Pahari</td>
<td>165</td>
<td>537</td>
<td>426</td>
<td>963</td>
</tr>
<tr>
<td>(in percentage)</td>
<td></td>
<td>(55.76)</td>
<td>(44.24)</td>
<td></td>
</tr>
<tr>
<td>Shahadra</td>
<td>119</td>
<td>369</td>
<td>298</td>
<td>667</td>
</tr>
<tr>
<td>(in percentage)</td>
<td></td>
<td>(55.32)</td>
<td>(44.68)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1.1 shows the distribution and sex-wise description of the households surveyed in the two slums. As is expected in both the slums the number of males exceeds the number of females. The sex-ratio, (table 1.2) for Kusumpur Pahari happens to be 793 males per 1000 females and for Shahadra it is 807 per 1000 females. In both the slums the sex-ratio is lower than the state figure which is pegged at 821 males per 1000 females. The reason behind the low sex ratio of Kusumpur Pahari could be attributed to the fact that those households that were targeted for the survey are recent migrants. For them males have a greater importance than females. Though they have migrated with their families, yet these families seem to have more male members than females.

Table 1.2

<table>
<thead>
<tr>
<th>SLUMS</th>
<th>Existing Sex Ratio in The Slums</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Population</td>
<td>Total no of Males</td>
<td>Total no of Females</td>
<td>Sex Ratio (F/1000M)</td>
</tr>
<tr>
<td>Kusumpur Pahari</td>
<td>963</td>
<td>537</td>
<td>426</td>
<td>793</td>
</tr>
<tr>
<td>Shahadra</td>
<td>667</td>
<td>369</td>
<td>298</td>
<td>807</td>
</tr>
</tbody>
</table>

... do
This is because the study concentrates on kids who are most vulnerable to pollution and at that reference age they happen to be the most susceptible not only to pollution but to a host of other infections and diseases. Then most of these households have mothers who do not go out to work but stay at home doing household chores namely cooking, etc. The argument for choosing such a sample is that these are the women who receive the maximum exposure as they spend most of the time within the house and are therefore less exposed to outdoor emissions. Another reason is that these mothers, with young children, tend to keep them with their person for nearly all the hours; more so if the child happens to be male. The most important reason for limiting the study to indoor air pollution was that it is difficult to account for the level and kind of exposure the mother would receive if she works in some factory or industry. Accounting for occupational emission exposure is not possible for a single researcher to undertake.
Thus a total of 284 households have been surveyed with 165 in Kusumpur Pahari and 119 in Shahadra with a total of 963 people in Kusumpur Pahari and 667 in Shahadra. The uneven number in the households surveyed in two locations of Shahadra is mostly due to the fact that government had demolished a large number of households in Shahadra relocating them elsewhere. As a result clumps of small slums exist all over Shahadra and so a large number household that meet the requirement of the study were difficult to find. Therefore both in Kusumpur and Shahadra ALL the households with such a combination of all the requirements were taken as the sample. In Delhi, the population living in the DMC recognised slums is around 1,854,685 with 322,713 persons below the age group of 6 yrs\(^7\).

The purpose of this section is

a) to look into the difference in the socio economic and demographic conditions existing in the two slums and reach a conclusive socio-economic status structure.

\(^7\) As per Census 2001 Provisional Population Totals
The sex ratio existing in the slums as given by the census 2001 is around 780 females per 1000 males. Keeping that in mind it can be said that both the slums show a higher sex ratio than the state figure for slums.

Caste and religious composition

The caste system exists even in urban areas with its institutional and systemic form, where emphasis is given on its hierarchical aspect and the way it incorporates various aspects of social stratification\(^9\). It is evident from the table 1.3, that in both the slums, the percentage of the SCs is the highest followed by the banias. Brahmin population on the is higher in Kusumpur Pahari. Though there is no caste problems existing in the slums, (that have any influence on the daily pattern of lives), yet people are quite conscious of their caste identity. The old caste prejudice still remains though the old settlers prefer to deny them professing modernity. They would rather marry their children to economically worse off families than break the caste structure. They still follow the traditional norms

Table 1.3

<table>
<thead>
<tr>
<th>Caste</th>
<th>Kusumpur Pahari</th>
<th>Shahadra</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Households</td>
<td>Percentage</td>
</tr>
<tr>
<td>Schedule Caste</td>
<td>81</td>
<td>48.80</td>
</tr>
<tr>
<td>Schedule Tribe</td>
<td>14</td>
<td>8.43</td>
</tr>
<tr>
<td>Rajput</td>
<td>19</td>
<td>11.45</td>
</tr>
<tr>
<td>Bania</td>
<td>22</td>
<td>13.25</td>
</tr>
<tr>
<td>Brahmin</td>
<td>15</td>
<td>9.04</td>
</tr>
<tr>
<td>Kayasth</td>
<td>9</td>
<td>5.42</td>
</tr>
<tr>
<td>Muslim</td>
<td>3</td>
<td>1.81</td>
</tr>
<tr>
<td>Christian</td>
<td>3</td>
<td>1.81</td>
</tr>
</tbody>
</table>

and regulations of their caste ad religious strictures. Among the SCs there exists a kind of social mobility which could be called a type of caste system within a caste. This is perpetrated essentially by the differences in their

\(^9\) Ram, Nandu,(1986), 'Schedule Castes:Social Stratification and Sources of Mobility in Urban India', in book 'Social Stratification in India' ed by K.L Sharma, Manohar Publications
economic status. In other words, their social mobility is facilitated somewhat by their utilisation of the various government measures for their betterment, and by their ability to perform religious traditions and rituals. Such is the case at least in the sample population.

Size of families

A slum may be an area overcrowded with buildings, and buildings overcrowded with people, or both. Density does not always result in unfortunate social consequences; the issue is primarily one of overcrowding. Whyte stressed the importance of overcrowding as a criterion for measuring slum conditions when he was conducting a sociological study of what he described as street corner society. People who live in such conditions obviously have little or no privacy, a factor that could well be of great importance, as it affects the interpersonal relations.

Table 1.4

<table>
<thead>
<tr>
<th>Size of families in Kusumpur Pahari (no of people/room)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Households (In percentage)</td>
</tr>
<tr>
<td>&lt;2</td>
</tr>
<tr>
<td>(2.41)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size of Families in Shahadra (no of people/room)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Households (In percentage)</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>(0.9)</td>
</tr>
</tbody>
</table>

In both the slums the family size shows that there is huge concentration in the 3 – 5 and 6 – 8 groups. In Shahadra the percentage of households in the 3 – 5 members group is higher than what exists in Kusumpur Pahari by nearly 2%. Households with depressed economic conditions usually tend to have larger families as number of earning members increase.

Education

Education can affect people's lives through several channels. It affects access to knowledge, information and new ideas. It enhances overall efficiency. It also changes overall attitudes and behaviour among other things, bringing


about an acceptance to change, an increasing independence from dogma riddled tradition and a tendency to question passivity and fatalism. Literacy or illiteracy shows the level of awareness that could be expected to exist in the slums. For the entire state the literacy level is pegged at 75.29% while among the males it is 87.37% and for the females it is 75%

Table 1.5

<table>
<thead>
<tr>
<th>Kusumpur Pahari</th>
<th>Age Groups</th>
<th>illiterate</th>
<th>Literate</th>
<th>Primary</th>
<th>Middle</th>
<th>High school</th>
<th>Matric</th>
<th>Higher. Secondary</th>
<th>Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 – 18 yrs</td>
<td>38 (13.72)</td>
<td>165 (59.57)</td>
<td>29 (10.47)</td>
<td>41 (14.80)</td>
<td>4 (1.44)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 – 25 yrs</td>
<td>9 (6.98)</td>
<td>46 (35.66)</td>
<td>23 (17.83)</td>
<td>50 (38.76)</td>
<td>1 (0.78)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26 – 35 yrs</td>
<td>35 (21.60)</td>
<td>71 (43.83)</td>
<td>17 (10.49)</td>
<td>39 (24.07)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 – 45 yrs</td>
<td>13 (17.57)</td>
<td>29 (39.19)</td>
<td>14 (18.92)</td>
<td>18 (24.32)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 46 yrs</td>
<td>18 (41.86)</td>
<td>15 (34.88)</td>
<td>3 (6.98)</td>
<td>7 (16.28)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shahadra</th>
<th>Age Groups</th>
<th>illiterate</th>
<th>Literate</th>
<th>Primary</th>
<th>Middle</th>
<th>High school</th>
<th>Matric</th>
<th>Higher. Secondary</th>
<th>Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 – 18 yrs</td>
<td>14 (8.10)</td>
<td>17 (9.90)</td>
<td>36 (20.90)</td>
<td>50 (29.10)</td>
<td>24 (14.00)</td>
<td>23 (13.40)</td>
<td>4 (2.30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 – 25 yrs</td>
<td>26 (34.20)</td>
<td>6 (7.90)</td>
<td>9 (11.80)</td>
<td>10 (13.20)</td>
<td>12 (15.80)</td>
<td>9 (11.80)</td>
<td>4 (5.30)</td>
<td>4 (2.30)</td>
<td></td>
</tr>
<tr>
<td>26 – 35 yrs</td>
<td>51 (40.20)</td>
<td>23 (18.10)</td>
<td>13 (10.20)</td>
<td>18 (14.20)</td>
<td>12 (9.40)</td>
<td>7 (5.50)</td>
<td>3 (92.40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 – 45 yrs</td>
<td>14 (25.50)</td>
<td>7 (12.70)</td>
<td>13 (23.60)</td>
<td>14 (25.50)</td>
<td>1 (1.80)</td>
<td>5 (9.10)</td>
<td>1 (1.80)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 yrs &lt;</td>
<td>14 (43.80)</td>
<td>11 (34.40)</td>
<td>2 (6.30)</td>
<td>4 (912.50)</td>
<td>1 (3.10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The overall education level, according to the table, shows a rather dismal picture for Kusumpur Pahari, majority of the sample population in there has no education above middle school. There is nobody who has finished school or in graduation. Shahadra on the other hand shows a better educational attainment. Though the numbers of illiterates are more in Shahadra than in Kusumpur Pahari, yet literates and people educated up to primary are higher in Kusumpur. The overall picture is better in Shahadra. Education above the level of primary is better there. Illiterates are more in the age group of 46 and above for both the slums.
Occupational Structure

Occupation decides the living standard of the population. The slum areas are most depressed sections of the society as they earn their livelihood through the least paying and the most menial of jobs involving long hours and most unhealthy of working conditions. This situation, as a result, affects their accessibility and utilization of the health services in a rather negative manner such that they live in a vicious circle of ill being.

At the onset the population can be categorised into a) Worker  b) Non-worker. Workers are also classified into

1. Working and studying
2. Self employed
3. Salaried
4. Wage labourers.

Table 1.6

<table>
<thead>
<tr>
<th>SLUM</th>
<th>Working/studying</th>
<th>Self employed</th>
<th>Salaried</th>
<th>Wage labourer</th>
<th>Total workers</th>
<th>Non workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kusumpur Pahari</td>
<td>8</td>
<td>69</td>
<td>96</td>
<td>113</td>
<td>286</td>
<td>674</td>
</tr>
<tr>
<td>(in percentage)</td>
<td>(0.80)</td>
<td>(7.10)</td>
<td>(10.50)</td>
<td>(11.70)</td>
<td>(29.69)</td>
<td>(69.26)</td>
</tr>
<tr>
<td>Shahadra</td>
<td>2</td>
<td>57</td>
<td>76</td>
<td>52</td>
<td>187</td>
<td>480</td>
</tr>
<tr>
<td>(in percentage)</td>
<td>(0.20)</td>
<td>(8.50)</td>
<td>(11.40)</td>
<td>(7.80)</td>
<td>(28.09)</td>
<td>(71.96)</td>
</tr>
</tbody>
</table>

The percentage of salaried workers is slightly more in Shahadra than Kusumpur Pahari but for wage labourers the figure is higher in Kusumpur Pahari. Both the slums have a very low percentage of workers. With less than 30% of the population working the percentage of dependents is very high. This leads a never ending struggle for survival.
The non workers generally include people who are retired / elderly, women doing household work, physically challenged and therefore unable to work, unemployed but seeking jobs or available for work and others which include children who are too young to do work and the unemployed who are neither seeking nor are available for work. The percentage of students is higher in Shahadra. But in Kusumpur Pahari percentage of retired and elderly people is higher. A little less than 30% are engaged in household work in both the slums.

The categories of workers categorized further to give a detailed picture of the kind of occupation the people are engaged in.

1. Construction unskilled
2. Construction skilled
3. Electric repair
4. Non electric repair
5. Manufacturing
6. Food processing
7. Trade (retail/vending/hawking)
8. Transport skilled
9. Transport unskilled
10. Unskilled menial
11. Domestic help
12. Other services
In Kusumpur Pahari 40.36% of the working population is involved in doing menial labour menial labour. In Shahadra, different kinds of trading give employment to 18% of the workforce. As there are several small and medium scale industries located in and around Shahadra, it employs the second largest workforce. None of the populace (at least in the sample population) is employed as domestic servants. On the other hand nobody is employed in the food processing cottage industry. All the above categories are pertain to major sources of income. Subsidiary sources of income, has not been considered as the amount if income, in most cases, hardly exceed 100 – 150 and therefore, does not make a significant difference to the total income and are of very casual in nature.

Table 1.9

<table>
<thead>
<tr>
<th>Kusumpur Pahari</th>
<th>Classification according to per capita income (Rs/ month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons</td>
<td>&gt; 100</td>
</tr>
<tr>
<td>Persons (In percentage)</td>
<td>9.04</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shahadra</th>
<th>Persons</th>
<th>&gt; 100</th>
<th>101 - 200</th>
<th>201 - 300</th>
<th>301 - 400</th>
<th>401 - 500</th>
<th>&gt; 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons (In percentage)</td>
<td>0.90</td>
<td>42.70</td>
<td>21.40</td>
<td>12.00</td>
<td>10.30</td>
<td>12.80</td>
<td></td>
</tr>
</tbody>
</table>
From the above table it is clear that the majority of the population in both the slums have a per capita income ranging between 100 rupees to 200 rupees per month in Kusumpur Pahari. Nearly 15% of the population in Kusumpur Pahari have a per capita income of above Rs 500 a month as compared to 12.8% in Shahadra. At the same time only 0.9% earn below Rs 100 a month in Shahadra whereas 9% of Kusumpur Pahari earn below that amount.

Housing Conditions
Poor slum housing is invariably associated with poor facilities and community services. Along with the shabbiness and the dilapidation, the park facilities are inadequate; the schools are of poor quality and other public facilities are inadequate. Streets and sidewalks are non-existent, rubbish and garbage bins overflow and they are almost never cleaned adding to the undesirable environment.

The housing in both the slums are of the similar structure. They have been divided into three categories of 'kuccha', 'semi kuccha' and 'pucca'. Mostly the tenements are of semi kuchha material. In kusumpur pahari majority of the flooring material is pucca in nature, around 39%. The dwellers usually have cemented floors but more often than not it is not on proper brick flooring. The cement is poured over roughly placed bricks which gives a very uneven floor. In Shahadra on the other hand the flooring is kuccha in nature. Consisting mainly of papers and plastics placed over roughly placed bricks. Around 48% of the houses have such kind of floors.
Table 1.10

<table>
<thead>
<tr>
<th>Type of Housing Structure in Kusumpur Pahari</th>
<th>Roof</th>
<th>kachha</th>
<th>Semi Pucca</th>
<th>Pucca</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Households (In percentage)</td>
<td>56 (33.7)</td>
<td>65 (39.2)</td>
<td>45 (27.1)</td>
<td></td>
</tr>
<tr>
<td>Wall</td>
<td>44 (26.5)</td>
<td>62 (37.3)</td>
<td>60 (36.1)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Housing Structure in Shahadra</th>
<th>Roof</th>
<th>kachha</th>
<th>Semi Pucca</th>
<th>Pucca</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Households (In percentage)</td>
<td>48 (41)</td>
<td>30 (25.6)</td>
<td>39 (33.3)</td>
<td></td>
</tr>
<tr>
<td>Wall</td>
<td>48 (41)</td>
<td>39 (33.3)</td>
<td>30 (25.6)</td>
<td></td>
</tr>
</tbody>
</table>

Usually it is the roofing material that determines the category of housing structure. But for this study all the three important facets of a house has been considered as it affects the indoor air pollution that exists inside the tenements. In Kusumpur Pahari, 39% of the households have semi pucca roof, i.e. a mixture of bricks, mortar, plastic and asbestos. With 33% having only kuccha type of roofs i.e. only plastics, tarpaulin and straw. On the other hand, in Shahadra, 48% have kuchha roofs. This is mainly due to that fact that these tenements were rebuilt after being bulldozed down by the government in a bid to relocate these slums. Those dwellings that were spared had pucca roofs. About 33.3% had roofs of bricks, cement and mortar.

The walling material is important as these emit the maximum amount of pollution when heated or put to fire. In Shahara, 41% had kuchha walling material consisting of sticks, cloth, plastic and tarpaulin sewn or dumped against one another. The use of plastic was most rampant. Only 25% of the households had pucca walls. This could again be contributed to the rebuilding of homes after the demolition bid. But in Kusumpur Pahari were there has been no such case of relocation or demolition, maximum number of houses had semi pucca walls, about 37%. Along with the entire all the other kuccha
building material some amount of bricks, mortar and cement has been used on the walls. About 36% of the tenements ad pucca wall structure. Which goes to show that the dwellers of these slums were better settled than those in Shahadra.

**Drinking Water**

The position regarding safe drinking water supply in the country at the beginning of the “Water and Sanitation Decade” was brought out by the 1981 census. It considered only tap water and water drawn from hand pump / tube well to be safe drinking water. 38% of the households in the country had access to it while it was available to 75% of the urban households (1981 Census). The Sixth (6th) Plan (1980 – 85) estimated that 84% of the urban population and 33% of the rural population was covered by protected water supply (FRCH, 1987 – Supplement to the ICSSR / ICMR Report)\(^\text{12}\). The contribution of clean water is an important one in the lowering of mortality as well as an excellent check on epidemics.

Shortages of drinking water, electric lights and sanitary facilities are common in the slums of developing countries\(^\text{13}\). Several hundred people may share one tap, so that it becomes practically impossible to keep it clean nad germ free especially when kept in buckets and cans. During the survey in Kusumpur Pahari it was found that though there were two sets of taps, each set having ten taps each, which supply municipal water, only one tap in each set works. Water is supplied only twice a day, i.e. when supply is good, for two hours. There is always a serpentine queue of buckets in front of the only functioning tap. When water supply is bad, then these people do not get water for even half an hour each. Often spending days without one drop.


Though majority of these people depend on the tap water, around 46%, there are others who have dug personal illegal tube wells. Tankers, too, provide water sometimes, but this proves expensive for them.

Table 1.11

<table>
<thead>
<tr>
<th>Source of drinking water in Kusumpur Pahari</th>
<th>Public tap</th>
<th>Tanker</th>
<th>Pilferage</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Households</td>
<td>77</td>
<td>17</td>
<td>0</td>
<td>72</td>
</tr>
<tr>
<td>(In percentage)</td>
<td>(46.39)</td>
<td>(10.24)</td>
<td>0</td>
<td>(43.37)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source of drinking water in Shahadra</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Households</td>
<td>92</td>
<td>6</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>(In percentage)</td>
<td>(78.63)</td>
<td>(5.13)</td>
<td>(4.27)</td>
<td>(11.97)</td>
</tr>
</tbody>
</table>

In Shahadra, the situation is better, as 78% avail the municipal tap water. Shahadra as a region has overall better water supply, so these slums too, get a good supply of water. As most of the households in these slums have been relocated the per capita availability of water seems to have increased. Moreover, there is pilferage of water taking place here, which was absent in Kusumpur Pahari.

Toilet Facilities

The picture of sanitation given by Environmental Hygiene Committee Report in 1949 in not qualitatively different even today. Most of the human wastes continue to be discharged untreated into the water sources; sewers and drinking water main pipelines run side by side. Leakages are common and mixing is rampant. Programmes for protection of drinking water sources are complementary to the sanitation programmes.

The sanitation component of the UBS programme designed for the urban poor includes low cost pour flush latrines as per UNICEF / TAG design so as to do away with dry bucket type latrines, especially in the balwadis, anganwadis and the PHCs.
Garbage and sullage disposal system includes the construction of bathing cubicles, garbage pits and simple drains in the slums. The slums being illegal squats the government refuses to recognize the basic rights of the dwellers.

The use of toilet facilities in the slums have been classified into

1. Open
2. Sulabh
3. Municipal toilets
4. Pit

Table 1.12

<table>
<thead>
<tr>
<th>Use of Toilet facilities in Kusumpur Pahari</th>
<th>Open</th>
<th>Sulabh</th>
<th>Municipal toilets</th>
<th>Pit</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Households</td>
<td>143</td>
<td>12</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>(In percentage)</td>
<td>(86.14)</td>
<td>(7.23)</td>
<td>(4.82)</td>
<td>(1.81)</td>
</tr>
</tbody>
</table>

Use of Toilet facilities in Shahadra

<table>
<thead>
<tr>
<th>No of Households</th>
<th>25</th>
<th>47</th>
<th>41</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(In percentage)</td>
<td>(21.55)</td>
<td>(40.52)</td>
<td>(35.34)</td>
<td>(2.59)</td>
</tr>
</tbody>
</table>

According to the above table it is seen that the people of Kusumpur Pahari. Around 86.14% prefer to go out in the open when nature calls. Municipal facilities are existing in the slums but only 5% utilize them as they are never cleaned and often breed diseases. Where as, in Shahadra, majority of the people prefer to go to the Sulabh souchalalays around 41%. Sulabh complexes are privately owned and the users have to pay a certain charge to the attendant. Though the slums are economically depressed yet most of the household opt for the use of the Sulabh souchalalays. This may be due to the fact that the sulabh complexes are kept relatively clean and there are water facilities. Alternatively the dwellers in Shahadra use municipal toilets. The use of open areas is the least hereas perhaps there is a dearth of open spaces in the area.
The Socio Economic Status of the Sample Households

As the main focus of the chapter is on the general socio-economic condition of each of the two slums surveyed, an attempt has been made to give it a more concrete shape. The socio-economic status is calculated taking some of the above discussed indicators vis-a-vis education, caste and income of the workers (as returned by them). Each of these variables have been weighted on a total of 100 points. Caste is the least important of the three so it has been given a total point of 20 followed by education which has been given a total point of 30 and the remaining 50 points are given to income as it was found to be the one most confounding variable of the three.

Education of a member of the household who has the highest education in the family and is an adult has been considered for determining the Education status of the family. The argument being that if a single member of the family has some amount of education then it automatically follows that he is the decision maker of that family. It can also be expected that he can take decisions based on logic and the need of the hour. It is also expected that the rest of the members would automatically turn to him in nearly all matters. Moreover, this member automatically determines the power structure of the family as it follows that he might be earning the maximum among all the others, who are less educated than him or are illiterates.

Then weightages have been attributed on a scale of 0 to 30. They are as follows:

<table>
<thead>
<tr>
<th>Illiterates</th>
<th>Literates</th>
<th>Up to Primary</th>
<th>Up to Middle School</th>
<th>Up to High School</th>
<th>Up to Matriculation</th>
<th>Up to Graduation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0)</td>
<td>(5)</td>
<td>(10)</td>
<td>(15)</td>
<td>(20)</td>
<td>(25)</td>
<td>(30)</td>
</tr>
</tbody>
</table>

Lower the education attained level lower the weightage given.

Caste and religion for each household is again weighted according to the sociological standing of the caste in the slum, on a scale of 5 to 20. They are as follows:
Christian / Muslims = (5), Schedule caste / Schedule tribe = (10), Kayasth / Rajput / Bania = (15), Brahmins = (20).

Lower the sociological standing lower the weightage.

Income of the household includes earnings from both the major and subsidiary sources of each person of the household. Though this is more often than not dubious but is taken as is reported by the household members. The per capita income reported for each member of the household is taken and then the mean income of the household is arrived at.

Then these groups have been given weightages according to the group they belong to on the logic that higher the group higher the weightage, on a scale of 0 – 50. They are as follows:

Less Rs 1000/- per month = (10), Rs 1001 – 2000 per month = (20),
Rs 2001 – 3000 per month = (30), Rs 3001 – 4000 per month = (40),
above Rs 4001 per month = (50).

Each household was found to have three separate values belonging to the three separate variables. These values were then added and a mean value arrived at. This is the socio-economic status of that particular household. Such SES status value was arrived at for each of the households for both the slums.

Then these values were further classified into five groups (with equal class intervals for both the slums as a comparative study is required) which shows that lower the SES class worse is the condition of those households.

Table 1.13

<table>
<thead>
<tr>
<th>Socio-economic Status of Households in Kusumpur Pahari</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SES Class</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>No of Households</td>
</tr>
<tr>
<td>(In percentage)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socio-economic Status of Households in Shahadra</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No of Households</strong></td>
</tr>
<tr>
<td>(In percentage)</td>
</tr>
</tbody>
</table>
According to the table 1.17 and fig 1.1 Kusumpur Pahari is the better off of the two slums as it has 48% of the households belonging to SES class V. It has the least percentage in class IV. Shahadra has the maximum of 47% belonging to SES class I. This sad status of the slum could be mainly attributed to the demolition and relocation drive of the government of India.

**Locational factors**

Kusumpur Pahari and Shahadra are both classified under the category of slums and as per various definitions of “slums” they are indeed one. There are a lot of physical similarities between the two especially in terms of socio-economic attributes, pattern of usage of facilities. Yet, there are a large number of differences also. One such difference, which was considered even while choosing the slums for survey was their locational factor. This was the most important determining factor as well as it was assumed that this locational difference would lead to differences in the behaviour of the people as well as their mindsets and general conditions existing therein. At the very outset, it was mentioned that Kusumpur Pahari is located in the south whereas Shahadra is located North-west of Delhi.
It is necessary to look into the characteristics of both these areas as a whole to determine the character of the slums concerned. Shahadra is an area which is quite industrial, small enterprises abounds as well as a couple of factories which belch out smoke. This area is a business centre though essentially concerned with manufacturing; there are lots of offices which are housed in very tall buildings, which at times act as a boon as it stops intermixing of pollutions. The slums in this area are housed in between these tall buildings. The largest of these slums which was located behind these tall buildings had been demolished to a great extent.

This area along with its manufacturing units, its offices, its low cost housing, its congestion and traffic and of-course, its slums do not have the air of posh and clean and well cared for atmosphere. Rubbish heaps lie all over the place, making the air unhealthy. In fact it would be better to say that this area can best be classified as having a low status. The people in these slums are mostly employed in different levels of work in these units. Before the demolition drive, they could avail the local facilities of health care, immunisation and education. The government, wanting to relocate them, no longer provides them the basic amenities.

On the other hand Kusumpur Pahari is located sandwiched between Vasant Vihar and Vasant Kunj, both of which are posh areas. The rich and the famous live here, a large number of consulates and embassies, too, are located here. This area, is therefore, one of the cleanest and best looked after. It has greenery and an all pervasive ambience of rich and high class living. The slum located in such an area, obviously hidden from the view of the general public, is sure to imbibe some of its good ambience. Located on the high raised bit of land, Kusumpur Pahari cannot be said to have all the amenities of its posh neighbourhoods. Like all slums it lacks, good sanitation, drinking water facilities. Its thorough fares are very congested. Tenements cluster together except in certain areas where there is some open space. There are clusters of rag picking families in several areas of the slum. There
are several NGOs working here both in the fields of health care and education. From the overall perspective this slum could be said to be living in a better condition than Shahadra. Moreover the local MLA, realising the vote bank impact tries to look after them.

Looking at the psycho-somatic set up of the people, there can be found a large difference. During the survey it was observed that the people of Shahadra were living constantly under a cloud of demolition fear. They were justifiably hostile and refused to answer questions. According to them surveys conducted by researchers generally led to demolition afterwards. It was only after repeated visits and establishing a certain level of camaraderie and a bit of trust that this survey could be undertaken. Men refused to go out to work for longer hours fearing for the safety of their families. Mothers kept their children around them for nearly all hours. Kids were not sent to school far off. A lot of them were withdrawn as well. The general status of the slum further deteriorated. There was a lot of damage to property and goods and they had resorted to make shift arrangements. Some households that were demolished had re-established themselves but with dismal results. These householders were even more suspicious and hostile and therefore a lot of problems were faced. Lowering of income and loss of savings has led to frustration and anger which in turn seemed to affect the general mental health status.

Kusumpur on the other hand, had escaped the wrath of demolition, there problems were different. There were households which had settled in that area since the early 1970s, which had pucca structures and more than one room with separate kitchen and a better socio-economic condition. The power structure, control and general decision making status was vested with these households. These were the better off people, who even had washing machines and cars. On the other hand there were families recently migrated from the villages who were employed as rag pickers or biri makers, for whom having one decent meal was a problem. Yet this slum has a very positive
factor about it. The young men and women strut along the road. Men boast of their very high standards of living (lopsided expenditure pattern, income for which cannot be accounted for), of taken their wives to expensive private hospitals for childbirth. They understand the importance of education even if they do not follow up on it. They realise that maintaining good health is important, though they still neglect their female counterparts.

The data gives a very descriptive idea of these two slums yet the underlying tensions or socio-economic imbalances generally complete the picture. These similarities or dissimilarities are essentially localised and cannot be recreated in another area or another slum.

Inferences from the above findings

When drawing conclusive ideas of both the slums under observation it can be said that Kusumpur Pahari is a better off slum than Shahadra. The reason can be found in the data as well as the observations made during the field work. As far as sex ratio of the sample population is concerned both slums have a higher value than that of the state value for the slums, even though Shahadra is a little better than Kusumpur. When looking at the caste structure it was seen that Scheduled caste population is more in the sample than any other caste with Kusumpur Pahari having a higher percentage than Shahadra. Brahmin population is the least in either of the slums. Households with 3 to 5 members are the most in Shahadra while Kusumpur Pahari has larger families of 6 to 8 members. The number of people educated upto high school and above is more in Shahadra than in Kusumpur. Yet it is strange that with better education Shahadra has larger percentage of non-workers than Kusumpur. Among the workers the largest percentage is employed in hawking and vending but in Kusumpur the portion of unskilled menial labourers is higher. Yet both the slums show a similarity when it comes to per-capita income where it is found that majority of the people have a per-capita monthly income of Rs 101-200. kuchha housing structures are more to
be found in Shahadra than Kusumpur where at least one aspect (like either the roof or wall is concrete) of the tenement is made of some pucca material. Most households in Shahadra has no separate kitchen, preferring to cook inside their one room structures as compared to Kusumpur, where, though the percentage of households with no separate kitchen is quite large, it is not as large as Shahadra. As for the type of cooking fuel used is concerned wood shavings are used by a larger percentage in Kusumpur than Shahadra where the majority of the households use dung. Even combination fuel usage like wood shavings and kerosene, wood shavings and plastic are more in Shahadra than in Kusumpur. As far as the Socio-economic status is concerned it is seen that the largest percentage of households in Shahadra fall under the lowest category of SES, i.e. Class I, while it is just the opposite for Kusumpur, where the largest percentage of households belong to the highest and best category i.e. class V.

Looking at the locational advantages and disadvantages it is found that Kusumpur by dint of its location in the rich neighbourhood has a more positive attitude than Shahadra. The location of Shahadra, midst industrial pollution and demolition has lowered the status of this slum. It is imperative that the mental set up and physical well being is affected in different proportions by these locational influences.