

CASE STUDY

EXPLORATIONS INTO THE WELL- BEING AND THE PREVALENT ENVIRONMENTAL IMPACTS ON THE HEALTH OF THE DWELLERS OF UKKADAM CMC COLONY

Hiranmayi Shankavaram – 2018



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ABSTRACT

Given the distinct constructs and complexities in the hedonic and eudaemonic (experiential and psychological functioning of a system respectively) definitions of well-being, researches have been diverse in measuring well-being and its antecedents across time and through various cultures. The status of health is a primary indicator of well-being through the measures of illness which marks out a negative affect that can undermine the opportunities for positive affect and life satisfaction.

Vitality in health has been assessed to be a salient variable that influences both somatic (related to the body) and psychological factors. The World Health Organization (WHO) gauges sociocultural contexts to determine and interpret well-being and, thereby, suggests indicators—all as relative and subjective concepts to measure well-being. With regulatory definitions, this research finds its platform in exploring the environmental impacts on the dwellers' well-being, specific to the site of Ukkadam Coimbatore Municipal Corporation Colony (Ukkadam CMC Colony). Nestled in the oldest part of Coimbatore city, Ukkadam CMC Colony—an informal settlement on untenable wetlands, with a high vulnerability index—unfolds dynamic layers in its morphological and sociocultural context.

The choice of this settlement is relative to the evident (physical) environmental concerns it portrays and its distinctive socio-economic context (especially amongst the Arunthathiyars, a caste predominant in the colony). The ramifications of literature studies helped in framing the aim of our research, methodology, and the measurement tools. Health determinants, concerns of crowding, i.e., the impact of built environment, and a check on governance outline the basis of this research. ♦

“The status of health is a primary indicator of well-being through the measures of illness which marks out a negative affect that can undermine the opportunities for positive affect and life satisfaction.”

ABBREVIATIONS

CMC	Coimbatore Municipal Corporation
EWS	Economically Weaker Section
HIG	Higher-income Group
HP	Health Post
LIG	Lower-income Group
MIG	Middle-income Group
NH	National Highway
NHM	National Health Mission
NMHP	National Mental Health Programme
NRHM	National Rural Health Mission
NUHM	National Urban Health Mission
OECD	Organisation for Economic Co-operation and Development
PIP	Programme Implementation Plan
PMAY	Pradhan Mantri Awas Yojana
PRA	Participatory Rural Appraisal
RAY	Rajiv Awas Yojana
RME	Routine Medical Examinations
SC/ST	Scheduled Caste/Scheduled Tribe
SDGs	Sustainable Development Goals
SfCPoA	Slum-free City Plan of Action
TAHDCO	Tamil Nadu Adi Dravidar Housing and Development Corporation
TNSCB	Tamil Nadu Slum Clearance Board
UFWC	Urban Family Welfare Centre
UN	United Nations
UNDP	United Nations Development Programme
UPHCs	Urban Primary Health Centres
WHO	World Health Organization

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PART 1 INTRODUCTION

1.1 Theory of Well-being:

Definitions and Complexities

The hedonic and eudaemonic definitions of well-being put across complexities in their constructs through the experiential and optimal (psychological) functioning of a system respectively. The experience, on the one hand, is measured as a degree of happiness or pleasure and/or the avoidance of negative impact or, simply put, pain. Eudaemonic well-being, on the other hand, works beyond the scales of happiness, to the modes of self-realisation, defining the extent to which a human body is fully functional—in simple words, as a measure of an individual's perception of his/her health status. Considering the distinct constructs, researches have been diverse in measuring well-being and its antecedents across time and through various cultures (Ryan & Deci 2001).

With the framework of well-being just not restricted to the absence of negative affect or mental illness, quality of life, health, happiness, and other related topics have been widely researched upon. And with the researches concentrating on the developmental and social processes, the definition and interpretation of well-being have often been implicitly or explicitly prescribed.

The *hedonic* approaches streamline the intent of a good society through the maximisation of self-interest and appetite amongst its people. Happiness or human experience as a measure of hedonic well-being looks into subjective components such as life satisfaction, presence of positive mood, and/or the absence of negative mood. The validity of subjective well-being is measured and assessed also through the type and scale of one's social activities, goals,

and achievements. With a meta-theoretical outlook of subjective well-being having been built on the assumption of “an enormous amount of malleability to human nature” (Ryan & Deci 2001, 145), it has been concluded that most works are a measure of the expectancy-value approach or that well-being is a function of the expectation to attain the outcomes one values, whatever those might be.

The *eudaemonic* perspective, as put forth by Aristotle, shunned the ideals of hedonic happiness and desires to define itself as an expression of virtue: doing what is worth, i.e., optimal well-being—this being attributed to the deep congruence of human values with their activities. Furthermore, the self-determination theory utilises the eudaemonic principles to measure and assess the following:

1. *Psychological growth*, through intrinsic motivation;
2. *Integrity*, through the practices of culture and tradition;
3. *Well-being*, through psychological health; and,
4. Experiences of *vitality* and *self-congruence*.

It is important to note here that eudaemonic principles stress that thwarting basic needs will result in negative psychological consequences in all social or cultural contexts, irrespective of how these basic needs are valued in the families or social groups. It is crucial to consider variables such as context, culture, developmental processes that continually influence the basic needs and thereby influence the measure of growth, integrity, and well-being at various levels, i.e., between persons or even within a person. The knowledge from these conflicting paradigms have led to varied inquiries that question the basis,

causes, effects, and dynamics of well-being. It has also been witnessed in several cases that the absence of hedonic or eudaemonic values is not indicative of its insignificance. In other words, the overlapping or distinctiveness of these virtues are indicative of measuring well-being in differentiated ways. Evidential inferences from different researches have also revealed the complexities in its definition, and well-being has thus been concluded to be a multidimensional phenomenon including both hedonic and eudaemonic principles (Ryan & Deci 2001).

1.2 Well-being and Health

With the above-mentioned validations to the definition of well-being, it is important to address the significance of well-being with physical health. The status of health is a primary indicator of well-being through the measures of illness which marks out a negative affect that can undermine the opportunities for positive affect and life satisfaction. Vitality in health has been assessed to be a salient variable that influences both somatic (related to the body) and psychological factors. Subjective vitality, as a measure of energy to the self, indicated eudaemonic well-being by correlating psychological factors such as personal autonomy (self-realisation) and physical symptoms. It is also crucial to consider the dimensions of psychological well-being which influence social relationships and promote health-related processes. Empirical and case study evidences can be devised to study these varied dimensions that influence health (Ryan & Deci 2001).

One of the main antecedents of well-being is the indicator of social class and wealth. It has been observed that sustenance and security are elevated with the rise beyond poverty, and it thus has a little influence on well-being. A focus on materialistic goals have lowered well-being, according to many studies, while the attainment of goals rooted in psychological needs largely influences well-being.

A measure of socio-economic status links to the dimensions of growth and integrity. The unfavour-

able social comparison processes that thwart the society have led to perceived inequalities during the futile efforts made by the poor to gain resources. Beyond these, social relatedness and satisfying relationships, as resilient factors, have been found to influence lifespan as a dimension of basic human needs. Affiliation, attachment, and intimacy between persons have been assessed as a measure of subjective well-being; the within-person feelings of relatedness indicated well-being in terms of positive affect and vitality. Apart from the aforementioned, other measures of well-being can be attributed to the competence and efficacy of an individuals' pursuit of self-concordant goals through intrinsic motivations. The efficacy of these indicators are measured based on their influence on the virtues of well-being, be it hedonic or eudaemonic (Ryan & Deci 2001).

What become crucial are the context and the perceptions of the context's influence on well-being. The context, through its cultural influences and widely discrepant social settings, brings about relativism into the measure of well-being (variants and invariants).

1.3 Regulatory Definitions of Well-being

World Health Organization (WHO)

The World Health Organization (WHO) ascribes "cognitive, emotional and behavioral responses at a personal level" to mental well-being. This could range from just an individual's perception of the absence of a disease, goals desired and sought to be achieved, economic success, happiness or contentment due to external factors, and stimulants that are sometimes beyond one's control (housing, employment, etc.). WHO gauges sociocultural contexts to determine and interpret well-being. WHO suggests indicators such as resilience (ability to recover from shocks/adversities); positive psychology; an individual's ability to optimally utilise available resources (money, knowledge, social support, culture, traditions, etc.); social capital (mutual benefits through social interactions); and quality of life, a measure of an individual's relatedness to his/her

context (sociocultural)—in line with or conforming to his/her aspirations, standards, or concerns—to be relative and subjective concepts to measure well-being (World Health Organization 2018).

WHO provides guidelines for measuring health and sets tools or instruments for generating the health profiles of cities. These guidelines propose methodologies considering the aspects of validity and reliability as the most important criteria in devising instruments of measure. Primarily, an in-depth framework for the assessment of health status and quality of life are provided. This framework includes a measure of disabilities, psychological well-being, social network and interactions, checks on social health, etc. The scales of measures and methodologies are also advised. Secondly, a measure of health behaviour is advised through analyses on diet; habitual traits such as alcoholism, drugs, and smoking; physical activity measures; culture; etc. With the determination of the target group, measurement of the relatedness of health and the environment is deciphered through study on food hygiene, air pollution, water and air quality, waste disposal systems, work environment, and urban environments. Thirdly, the socio-economic characteristics are measured through the profiles of education, employment, and housing and health inequalities or deprivations. These guidelines form suggestive tools in the development of the health profiles of a large population and further assist in proposing comparative analyses for shifts in population (Garcia & McCarthy 1996; World Health Organization 2011).

Organisation for Economic Co-operation and Development (OECD)

The Organisation for Economic Co-operation and Development (OECD) has developed a framework for understanding well-being through three main categories: material living conditions to determine people's command over resources and their consumption; quality of life as an intrinsic attribute measuring the non-monetary opportunities and the

chances for individuals' responses varying contextually; and, sustainability of the existing socio-economic systems and the influence of human activities on various types of capital (natural, economic, social, and human). Furthermore, quality of life being a domain of well-being, it categorises health status as its primary indicator, along with attributes such as education, social relatedness, governance, environmental quality, security and sustenance, etc.

Income and wealth have been attributed to well-being, for they can bring about non-economic benefits through better access to health and education, which in turn influences life satisfaction and the possibility of living in safe and cleaner areas. Availability of jobs influence people's command over resources and opportunities to fulfil their goals and intrinsically help them build politically stable and healthy environments.

Housing is one of the fundamental human material needs and forms a significant part of a household's expenditure. A direct relation has been established between the quality of housing and its impact on health—both physical and mental, family functioning, and social processes. The indicators for the same are measured in terms of the number of rooms per person in a dwelling. Crowding indicators have been devised to measure the number of rooms in a dwelling by the number of persons living in it. OECD countries specify a range of 1.2 rooms per person in east European countries to 2 rooms per person in countries such as Australia, Belgium, New Zealand, etc. The definition of crowding, the ambiguities in its definitions, and its impacts on health are detailed later in the paper. Indicators such as access to facilities for maintaining personal hygiene, i.e., the presence or absence of an indoor, flushable toilet and a bathroom, are also considered (Organisation for Economic Co-operation and Development 2011). The absence of precise guidelines, in terms of rooms per person in India, indicates a probable reliance on regulatory standards specified by WHO or the UN-Habitat. However, considerations of the housing boards—

established under the Housing for All scheme, in different states of India, to cope with the growing housing needs as a response to rapid urbanisation and increased migration—work towards the provision of good-quality shelters for people who belong to the economically weaker section (EWS), lower-income group (LIG), middle-income group (MIG), and higher-income group (HIG) at costs affordable to them. The amendments to the Housing Act suggest the provision of additional floor indices, varying according to the income groups mentioned above. It is important to note here that a bare minimum of 30–40 sq. m. of floor area has been mentioned for the economically weaker sections (Housing and Urban Development Department, Tamil Nadu, 2017).

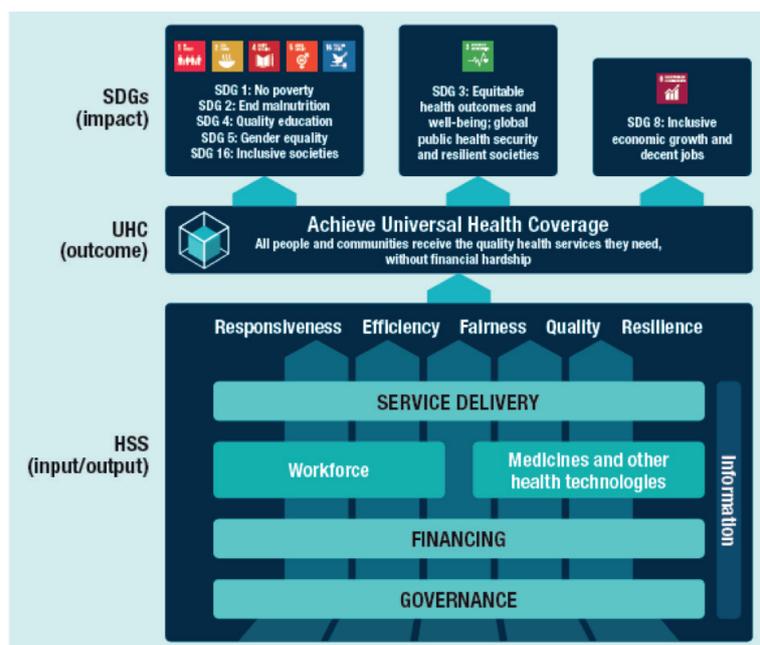
It has been established through surveys and researches that health status has been viewed as topmost priority by people, along with the availability of jobs. Quality of life has been continually linked to health status, which, in turn, links itself to other indicators such as access to education, access to jobs, good income, healthy community life, and other social processes. Apart from these, the general indicators for health status also include measures of life expectancy and morbidity and people’s satisfaction with their health status.

The United Nations Development Programme (UNDP), Sustainable Development Goals (SDGs), and the World Health Organization (WHO)
The SDGs, also called ‘global goals’, aim at ending poverty to protect and work for the planet’s and its people’s prosperity. The aspect of health features as a pivotal objective under Sustainable Development Goal number 3, with 13 targets specified by the UN, and works towards “access to good health and

well-being as a human right”; its agenda is to facilitate equal access to health services to all. The actions undertaken as per this agenda also look into health-care costs (specifically for preventable diseases) that are on the rise and have pushed many into poverty. Amongst the 17 goals specified under Agenda 2030, the WHO also recognises certain overlapping SDGs (through mutual benefits and contributions) that directly or indirectly impact the health statistics of a nation, more so as a monitoring exercise and the SDGs’ relevance in various countries. The global goals such as SDG 1 – ‘no poverty’, SDG 2 – ‘end malnutrition’, SDG 4 – ‘access to quality education’, SDG 5 – ‘gender equality’, SDG 16 – ‘inclusive societies’, and SDG 8 – ‘inclusive economic growth with decent jobs’ contribute to the individual targets of SDG 3 in creating resilient societies and increasing global health security (World Health Organization, 2017b). **Figure 1.1** illustrates the framework for strengthening health systems and the provision of universal health coverage through SDGs.

Figure 1.1

Framework for strengthening health systems and the provision of universal health coverage through SDGs



Source: WHO Health Statistics 2017b

The monitoring exercise by the WHO also reveals global health indicators for life expectancy at birth, mortality rates for infants (birth to 5 years) as well as for adults (15–60 years). With records of nearly 20 per cent of deaths occurring amongst children who are below 5 years of age, it is crucial to highlight the levels and trends of child mortality, including neonatal mortality which is witnessed in large numbers (especially in low-income settings). In India, life expectancy at birth has been recorded as 68.3 years (as of 2015) for both sexes; 27.7 out of every 1,000 births has been recorded as the neonatal mortality rate (as of 2015), showing a decline in its numbers from 34 for every 1,000 births, for both sexes (recorded in 2009). The mortality rate among children who are below 5 years of age (for every 1,000 live births, for both sexes) has been recorded as 47.7 (as of 2015) compared to 66 in the year 2009.¹

Furthermore, the WHO specifies the level and distribution of cause-specific deaths (mortality and morbidity rates) grouped into categories such as communicable, non-communicable, nutritional deficiencies, injuries, and maternal and perinatal conditions. The records also specify the cause of death amongst children below 5 years of age as diarrhoea, HIV/AIDS, malaria, measles, and pneumonia, along with neonatal complications such as premature births, congenital abnormalities, asphyxia during birth, etc. Excerpts from this table, specific to India, have been mentioned at the end of this paper (World Health Organization 2011; 2017b).

1.4 Discussion

With the limitations in the consideration of life expectancy and mortality rates, i.e., its indicators' relativity to health status, given the scales of applicability (larger populations), the definition and even the measurement of well-being seem to be only partially substantiated. Morbidity rates are complex to determine and generalise considering the cultural influences, contextual specificities, and variety of conditions (both mental and physical).

However, irrespective of the countries' morbidity rates, political systems, and health systems, it has been concluded by the OECD that low income and low education lead to high mortality and morbidity, the analysis pointing to poor and difficult life-work circumstances, poor lifestyles, and poor access to good-quality healthcare.

The current research, by and large, concentrates on aspects of health and its relatedness to well-being as a review of the context's (Ukkadam CMC Colony's) physical and socio-economic characteristics. With the WHO specifying the tools or instruments of analyses through the measurement of health status, quality of life, health behaviours, and socio-economic characteristics, the indicators relevant to the context of this study have been devised.

An introduction to the existing scenario of informality and a review of the diverse, dynamic aspects of the context are discussed in the subsequent section. ♦

¹ The role of Millennium Development Goals appears to have an impact on the positive shift in numbers, considering the challenges of a large population, such as that of India. The adult mortality rate (probability of dying between ages 16 and 50, for both sexes) has been recorded in 2009 at 212 per 1,000 of the population compared to 256 (as recorded in 2000).

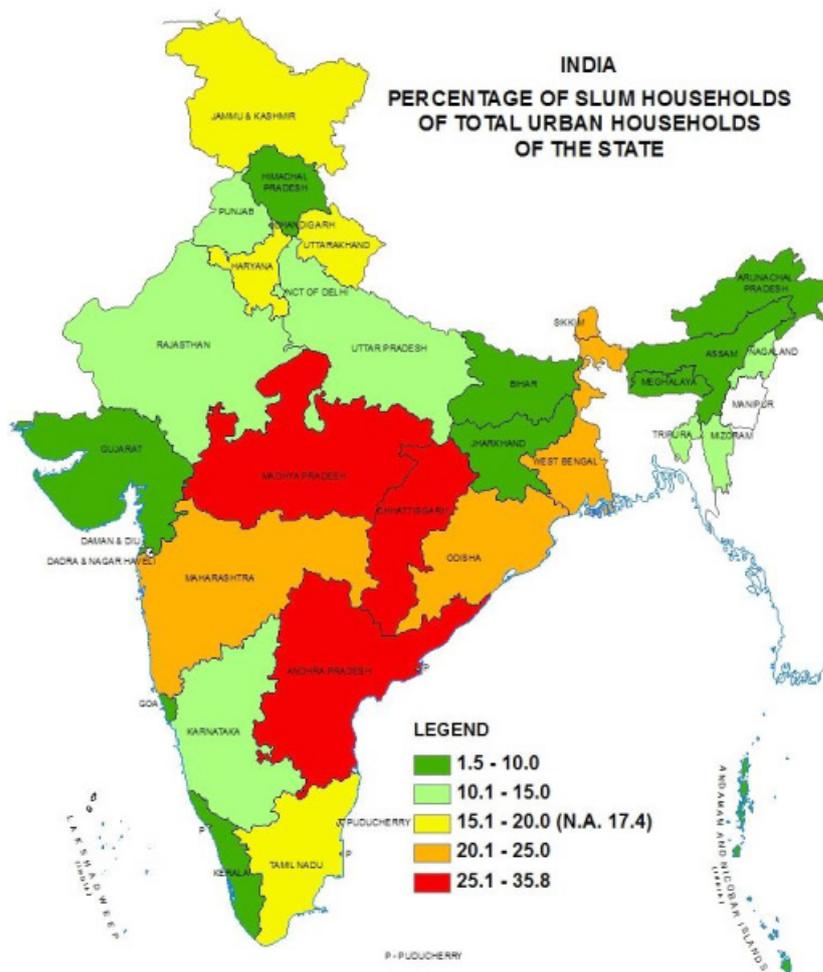
PART 2 CONTEXT

The growing trends of any city demand an expeditious effort in justifying corresponding urban needs such as shelter, employment, and others. The apparent reality, today, demonstrates unceasing crevices that lead to the city’s inability to meet these basic necessities. Furthermore, the inefficient urban economies of a developing world seem to

be implicitly promoting the informal sector that is providing for the gaps in employment and housing. This is termed as “dead capital: a productive intent which does not help or influence the rightful owners (who live and work there)” by Hernando De Soto (National Institute of Technical Teachers Training and Research, Chennai, 2013).

Figure 2.1

Percentile comparison between slum households and overall households



Source: SFCPoA, Coimbatore city, by NITTR, Chennai

The rise in such informal settlements now accounts for around one third of the world’s urban population. Moreover, overcrowding, substandard houses, poor sanitation, and a lack of access to safe water seemingly outline their stark characteristic and reveal the probable vulnerabilities that may follow.

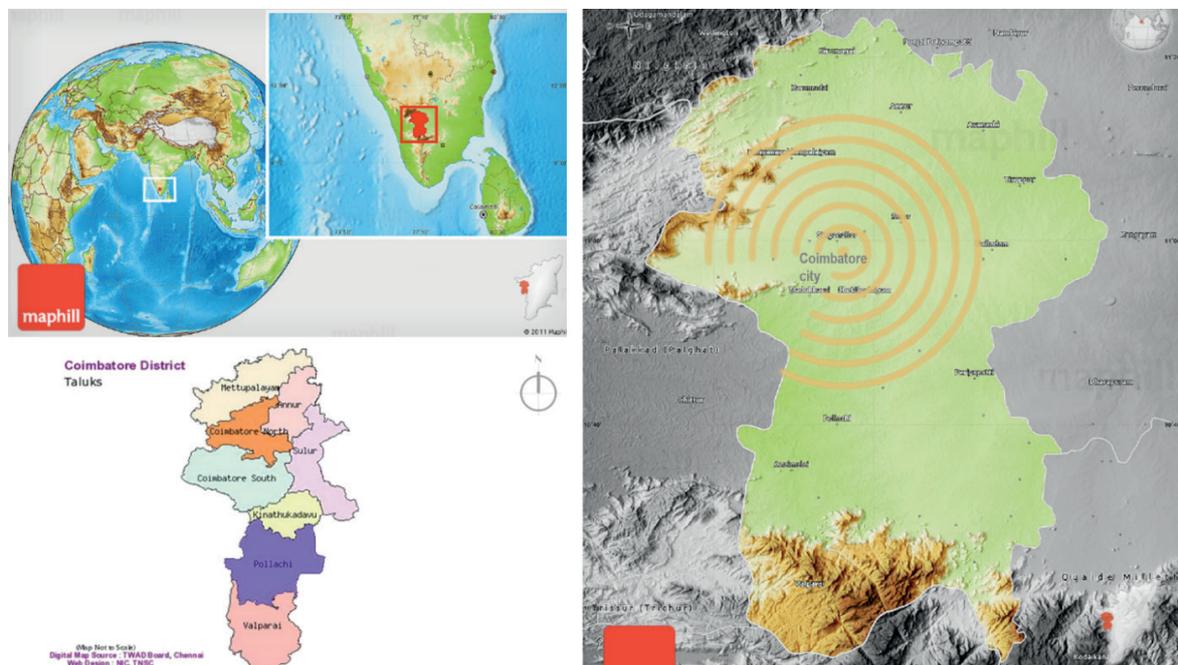
What adds to this chaotic development is poor governance, apart from evident population explosion. The dwellers invest less on housing, and bearing a secure tenure is mostly deficient. Acquiring the latter remains to be a tedious affair and such settlements seem to persist. Most Indian cities confront these challenges, and the same can be asserted for the city of Coimbatore. In India, Tamil Nadu falls under the medium category, with 15–20 per cent of its urban population living in slum settlements. **Figure 2.1** shows the proportion of slum households to the urban households in the country.

An overall view of Coimbatore city and its profile has been discussed earlier. To reiterate, the following maps (**Figures 2.2 and 2.3**) firstly present the context of Coimbatore city with respect to India and the state of Tamil Nadu and, secondly, the spread of informal settlements within the Coimbatore Municipal Corporation limits. The common features of such settlements falling within the corporation limits include the following:

- a. Lack of or inadequate access to safe drinking water and sanitation;
- b. Substandard housing and inadequate structures;
- c. Hazardous locations;
- d. Overcrowding and high density; and,
- e. Security of tenure. As a part of our research for the Building Inclusive Urban Communities (BInUCom) project, four such settlements—Yerimedu, Muthanakulam, Ukkadam, and Kamarajapuram—have been selected with specific objectives having been identified in and assigned for each.

Figure 2.2

Context of Coimbatore city



Source: www.maphill.com

EXPLORATIONS INTO THE WELL-BEING AND THE PREVALENT ENVIRONMENTAL IMPACTS ON THE HEALTH OF THE DWELLERS OF UKKADAM CMC COLONY
 PART 2 – CONTEXT

Figure 2.3

Zones of the city along with the slum distribution

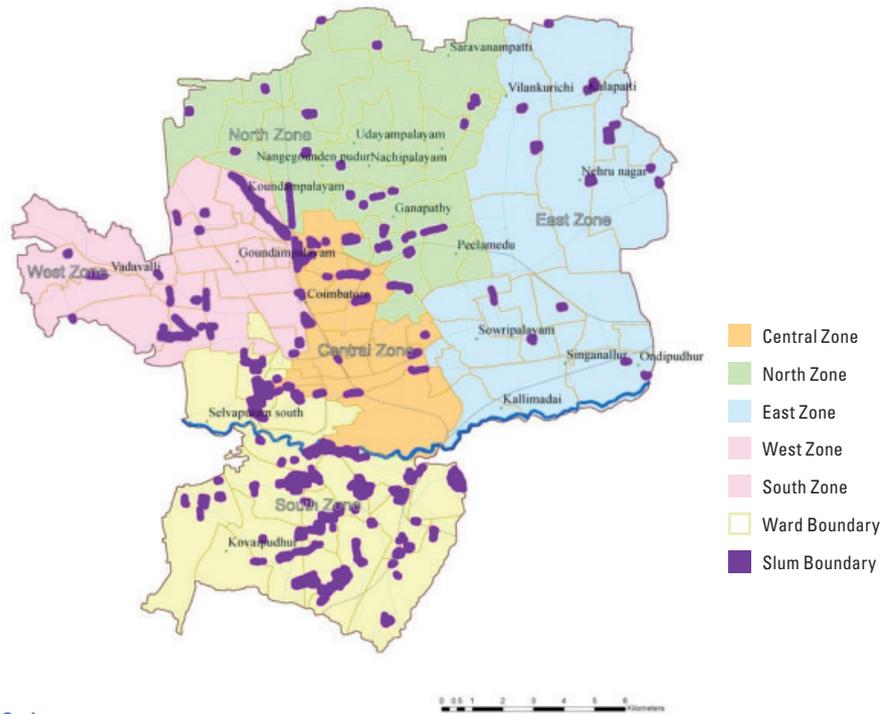
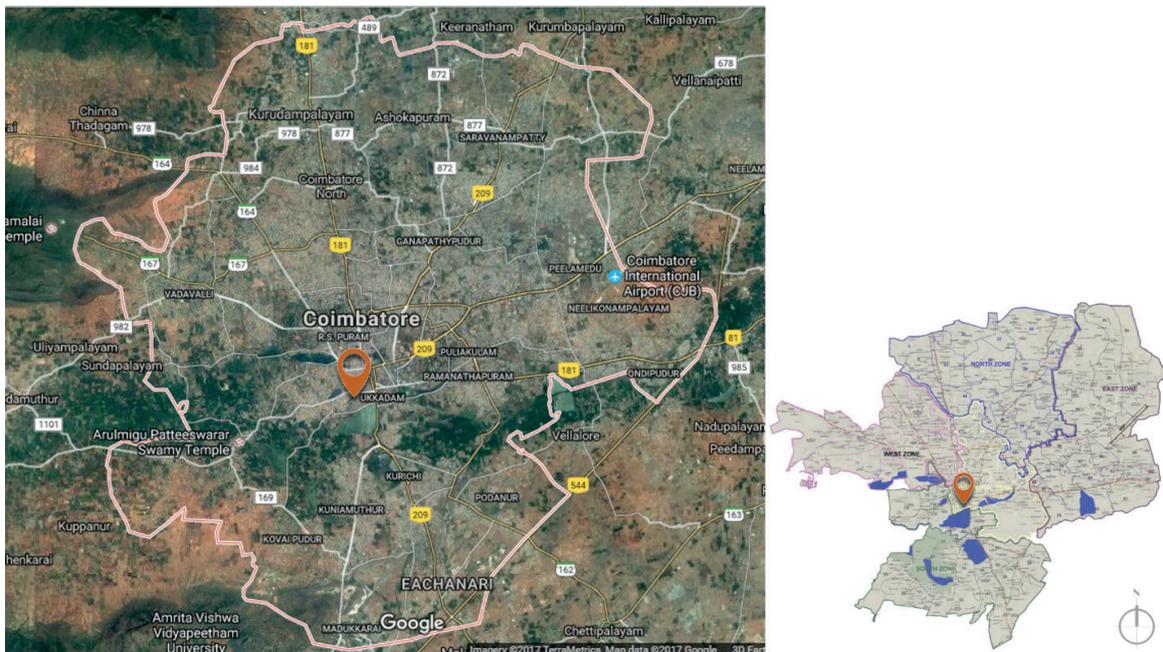


Figure 2.4

Context of Ukkadam in Coimbatore city



Source 2.3: SFCPoA, Coimbatore city by NITTR, Chennai

Source, 2.4: Google maps and map from Coimbatore City Municipal Corporation (CCMC) with additional layers by the author

Context of the Study: Ukkadam, Coimbatore

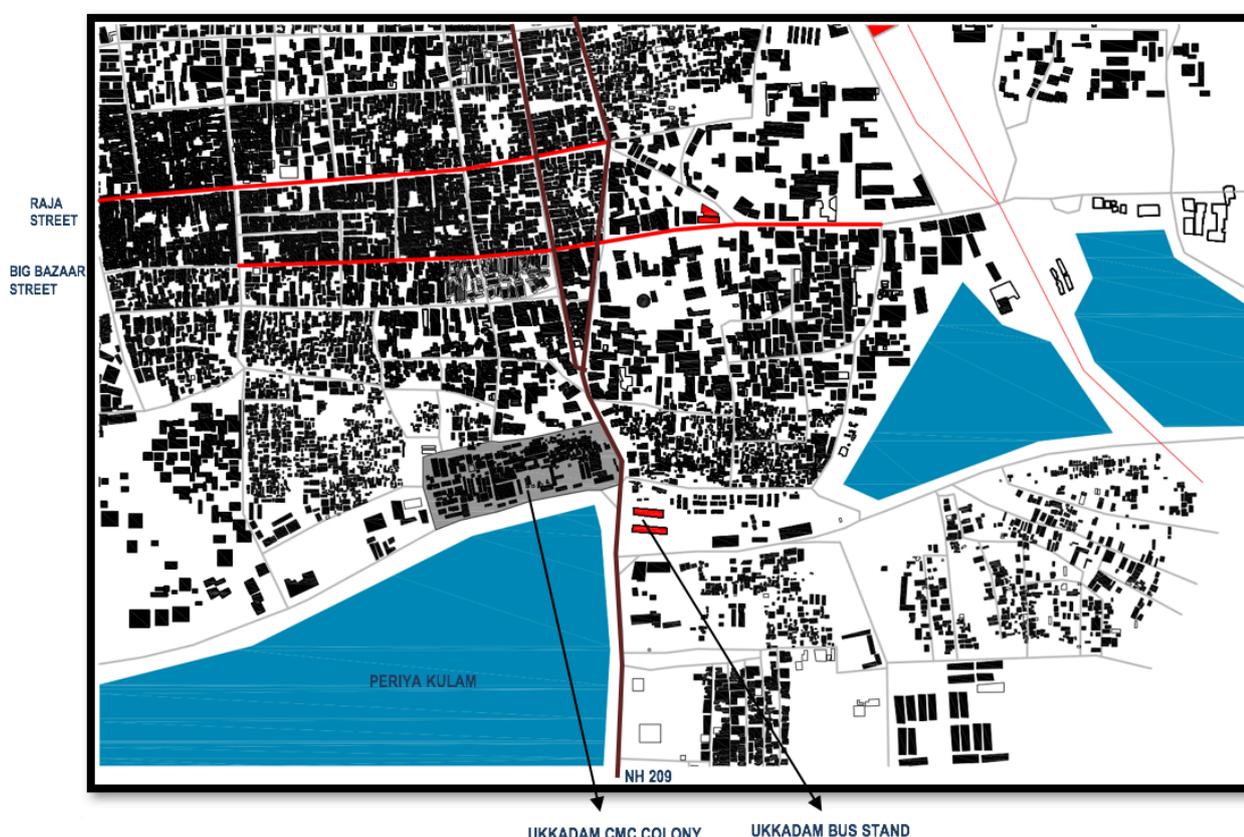
Ukkadam, located in the central zone of the city (Figure 2.4), typifies the oldest of settlements in Coimbatore. It is flanked by National Highway 209, which connects the city to Dindigul, via Pollachi, towards the south, and to Bengaluru towards the north. Thus, one of the three main bus terminals of the city is located in Ukkadam—it connects Coimbatore to the other cities through the National Highway and also serves as a feeder to radial roads within the city. Ukkadam also houses vibrant markets for fruits and vegetables that are functional throughout the year; the fruit market stretches from the junction of the National Highway and the Perur Bypass Road to the vegetable market, which is situated in the centre of Ukkadam’s informal set-

tlement—the Coimbatore Municipal Corporation Colony (CMC Colony). Ukkadam, on the whole, enjoys a sense of dynamism and historical prominence due to its location. Its proximity to the Coimbatore Town Hall, also called the Victoria Town Hall and declared to be of historical importance; the bustling commercial activities along Raja Street; numerous temples; and, the fishing activities in Periya Kulam² adds vivacity to the area. Periya Kulam or Ukkadam Lake is spread over an area of 1.3 sq. km. and is fed by the canals of Noyyal River. It boasts of some rich fauna, especially avifauna.

Figures 2.5 and 2.6 mark the important landmarks of and the public services accessible to the CMC Colony at Ukkadam.

Figure 2.5

Context of Ukkadam CMC Colony



Source: Maps created in Google My Maps by KAHE

² Periya Kulam etymology: *Periya* means ‘big’/‘large’ and *kulam* means ‘waterbody’/‘lake’.

EXPLORATIONS INTO THE WELL-BEING AND THE PREVALENT ENVIRONMENTAL IMPACTS ON THE HEALTH OF THE DWELLERS OF UKKADAM CMC COLONY
 PART 2 – CONTEXT

Figure 2.6

Proximity map showing the landmarks and amenities in the region

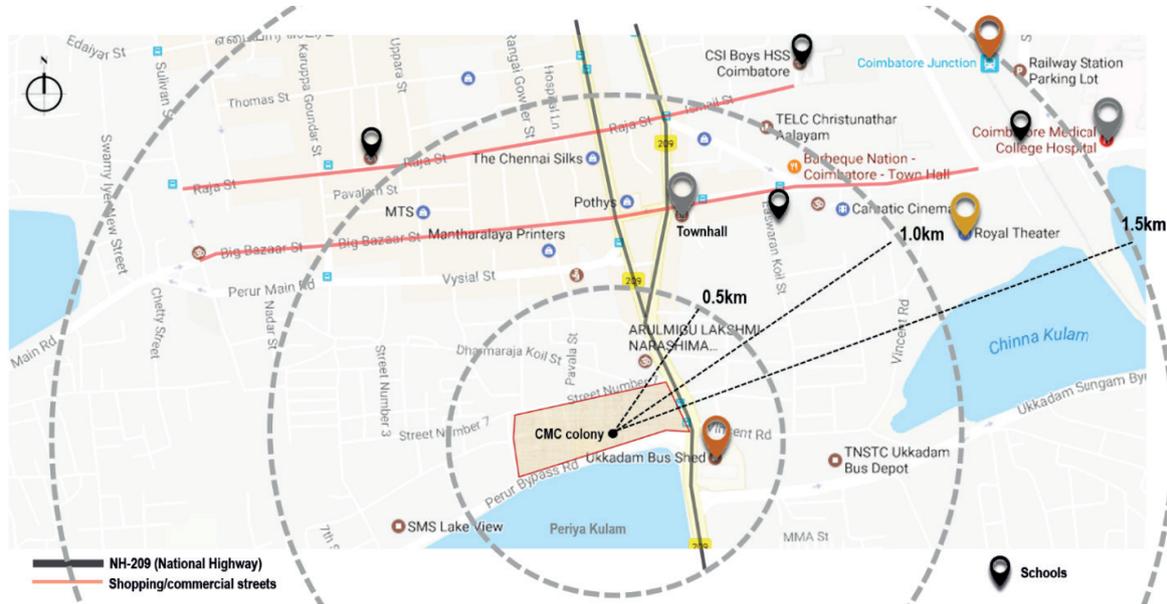


Figure 2.7

Ukkadam vegetable market



Figure 2.8

Victoria Town Hall



Figure 2.9

Ukkadam bus terminus



Figure 2.10

Ukkadam fruit market



Source 2.6: Map created in Google My Maps by KAHE

Source 2.7: KAHE

Source 2.8: <http://wikimapia.org/5075058/Victoria-Town-Hall-Coimbatore-1882>. Accessed June 26, 2017

Source 2.9: <https://www.quora.com/Is-Coimbatore-a-nice-place-to-settle-down-I-have-been-offered-a-job-in-Coimbatore>. Accessed June 26, 2017

Source 2.10: KAHE

**Pilot Study (conducted on November 2, 2016):
 Ukkadam CMC Colony at First Glance**

Ukkadam CMC Colony is bordered by National Highway 209 and the fruit market on its eastern side and the Periya Kulam on the southern side. The population in this settlement is close to 1,000 households, with most of them working as conservancy workers—they belong to the Arunthathiyar

caste (described below)—at the municipal corporation. The Slum-free City Plan of Action (SFCPoA)³ has identified this slum as being situated on untenable wetlands and with a predominance of semi-pukka houses and a high deficiency matrix of 3x3 (Appendix 6).

Figures 2.11 and 2.12 demarcate the context and the location of the settlement.

Figure 2.11

Immediate surroundings of the settlement

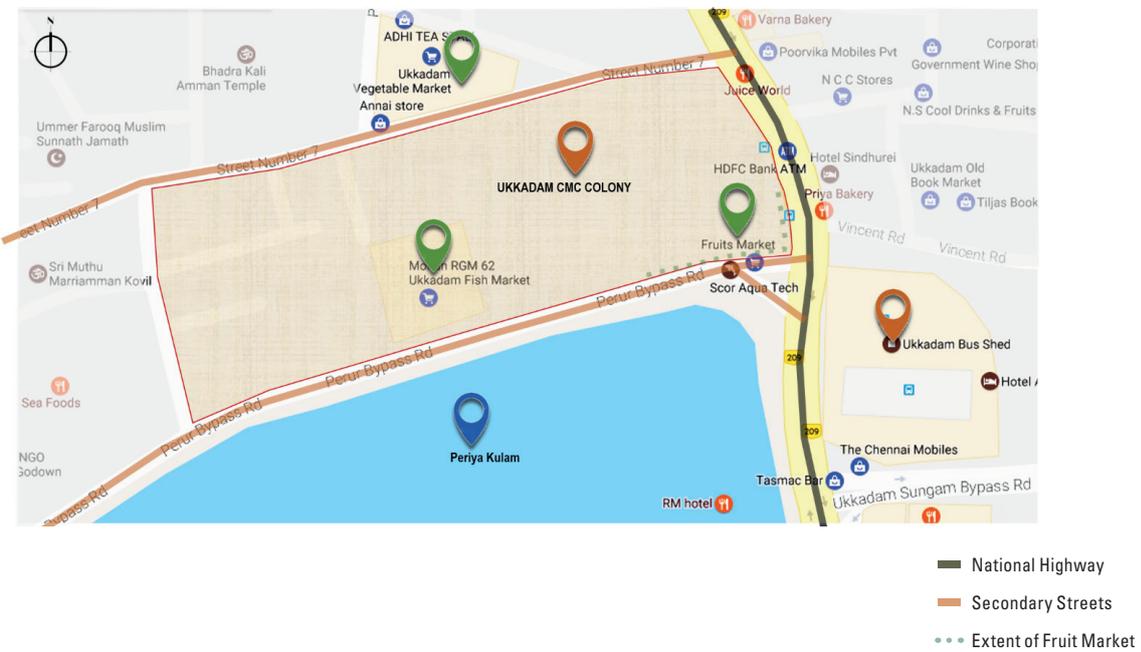


Figure 2.12

Ground plan of Ukkadam CMC Colony



Source: Maps created via Google My Maps by KAHE

3 The Slum-free City Plan of Action (SfCPoA) is devised under the Rajiv Awas Yojana (RAY) as a city-level plan for urban local bodies to improve and develop the existing slums and provide houses, basic civic infrastructure, and social amenities for the urban poor, projected and prioritised for a time period of 10–15 years. A deficiency matrix is prepared in the profiles of the slum settlement with an analysis of the vulnerabilities and the existing infrastructure. For more information, please see: <http://mo-hua.gov.in/upload/uploadfiles/files/3RAYGuidelinesSFCPPdf>.

Figure 2.13

Bird's-eye view of the settlement



The Arunthathiyars: ‘the Dalit⁴ among Dalits’

This community is largely spread across the western part of Tamil Nadu (historically claimed to have migrated from Andhra Pradesh, hence they are a large number of Telugu-speaking people). It has been claimed that during the Vijayanagar empire (early 16th century), the warriors (Naga Nayakars) sent to Pandia (now Tamil Nadu) were accompanied by cooks, tailors, and servicemen from this community. Nevertheless, the history of this clan has been rewritten several times to assert their identities as a revolt to the injustices (discriminations) done to them (Krishnasamy 2011).

1) Socio-economic Profile of the Arunthathiyars

Being one of the main subgroups, the Arunthathiyars form a large portion (nearly 7,71,659, i.e., 6.5 per cent) of the Scheduled Caste population (19 per cent of the total population) in Tamil Nadu (Census of India 2001). Also known as Chakkaliar, Adi

Dravida, Madari, etc., the Arunthathiyars follow Hinduism. Traditionally, their primary occupation was to make leather goods. Just after Independence, with the influence of British rule and the formation of municipal corporations in each town/city, the Arunthathiyars were roped in for work such as scavenging, cleaning of drains, sweeping, etc. In Tamil Nadu, 95 per cent of the Arunthathiyars are scavengers. Today, their professional boundaries have expanded, and they are occupied as cobblers, labourers, construction workers, etc. The community's women too participate in economic activities and add to the household's income. Yet, Arunthathiyars are often found to be living in miserable conditions.

They are treated as untouchables not just by the upper-caste people, but also by other Dalit subgroups. Hence, they are also called the ‘Dalit among Dalits’. They are forced to live in segregated colonies such as *cherrys*⁵ in rural areas or slums in the urban areas.

⁴ ‘Dalit’ is a term mostly used for the castes in India that have been subjected to untouchability.

⁵ Cherry (or cheri) means ‘settlement’ in Tamil.

Consumption of alcohol is seen amongst both men and women (about 90 per cent of the Dalit adults are addicted). It has been observed that this has led to a deterioration of their health, negligence in childcare, and undying poverty (Krishnasamy 2011).

The literacy rate among them is 53.7 per cent, with 34 per cent (Table 2.1) of their population having primary education. The drop-out rate is high among children during the middle-school years, and most children take up jobs in restaurants, mechanic sheds, etc.

Table 2.1

The literacy rate and education levels within the caste

NAME	LITERATE, WITHOUT EDUCATION LEVEL	BELOW PRIMARY	PRIMARY	MIDDLE SCHOOL	MATRIC/SECONDARY/HIGHER SECONDARY, INTERMEDIATE, ETC.	TECHNICAL AND NON-TECHNICAL DIPLOMA	GRADUATE AND ABOVE
Literacy rate among Arunthathiyars	10.5%	23.6%	34%	16.1%	13.5%	0.5%	0.7%

As per the Census of India, a person aged 7 and above, who can both read and write with an understanding in any language, is treated as 'literate'.

A person who can only read but cannot write is 'illiterate'.

Source: <https://data.gov.in/keywords/literate-without-education-level>.

Apart from the challenges that the caste itself portrays, the Arunthathiyars also face issues such as bonded labour from upper-caste people who also levy a heavy interest on the loans taken from them by the community's individuals. Their daily wages are mostly consumed by the accumulated interest and also in their consumption of alcohol. Economic instability has, in turn, affected the education levels among the children at the secondary-school level. It has been recorded that only 10 per cent of the clan owns small pieces of land, while most of them are landless labourers (Krishnasamy 2011).

2) Culture

The culture is by and large associated with Mudurai Veeran, the Army General of the Vijayanagar empire; the people identify themselves as his disciples. The atrocities or injustices done to this clan and the gruesome rituals involving them are many—the discrimination by upper-caste Goundar clans, prohibition of Arunthathiyar women from entering temples, etc. Such atrocities, today, might not be visible to the naked eye; however, they do persist and take time to fade, considering their low literacy rates (Krishnasamy 2011).

3) Government Schemes

Reservations of 15 per cent in all sectors specified by the union government are provided for the Scheduled Castes by the state governments through the implementation of welfare programmes and strategies. In Tamil Nadu, the reservation stands at 18 per cent, within which the Arunthathiyars enjoy a separate 3 per cent quota from amongst an ocean of 76 Scheduled Castes recorded in the state. Development programmes; medical aid of up to Rs.1,00,000 for surgeries; the establishment of finance corporations for economic well-being, such as Tamil Nadu Adi Dravidar Housing and Development Corporation (TAHDCO); housing and drinking water schemes; capacity building centres; etc. are stipulated at the central-government level and are specifically decentralised at the state levels for Schedule Castes (Ranjithkumar 2004).

It is important to consider the aforementioned criteria to ascertain the accessibility of schemes at contextual levels through the indicators of governance and equity. The reference to this will be made in the subsequent analyses from our site survey.

Source Table 2.1: <http://ijljs.in/wp-content/uploads/2016/02/16.pdf>

Pilot study

The pilot study, conducted through informal conversations with the dwellers and an interview with the health officer, highlighted the following:

Primarily, the predominance of daily-wage workers (as mentioned in the above reference of the Arunthathiyars), employed mostly for part-time, contractual work by the municipality, urges them to find more work to fend for their expenses.

Secondly, unsanitary waste disposal, open drainage systems, and a filthy environment caused specifically by the dumping of the fruit and vegetable markets' waste adds to the settlement's squalor.

Thirdly, the housing complex provided by the housing board is more than 50 years old and is unkempt due to low maintenance by both the board as well as the inhabitants. This probably also outlines the squalor, which can be mostly attributed to behavioural and social aspects. With the migration of the Arunthathiyars (during the British rule) playing a key role in the formation of such settlements for decades, and the incessant attention given by government schemes such as TAHDCO and housing schemes such as Rajiv Awas Yojana (RAY) which is presently called Pradhan Mantri Awas Yojana (PMAY), the present dwellers tend to invite family and friends to live with them, leading to opportunistic encroachments. Also, since the investment in housing and its maintenance by such dwellers is poor (also linked to the absence of land ownership), the built environments portray an inelegant appearance.

The built forms, which can be broadly classified based on physical appearance, include the following:

1. The housing complex of three floors (G+2), with four units per floor (provided by the government);
2. The independent houses with masonry walls and tiled roof (self-built encroachments);
3. The independent houses with masonry walls and metal sheet roof (self-built encroachments).

With the decrepit appearance of the old housing complex, all the households have been categorised as 'semi-pukka' by the Slum-free City Plan of Action (SFCPoA) of the Tamil Nadu Slum Clearance Board (TNSCB) (National Institute of Technical Teachers Training and Research, Chennai, 2013). Housing typologies will be discussed in detail later in the paper. Furthermore, with the location of the settlement on wetlands, the unknown/inefficient connectivity for the drainage system of such wetlands, and with open drains running in front of their homes, vulnerability to flooding during monsoon or heavy rainfall is high. Overflooding may cause the drain water to enter houses and trigger extreme health risks. Individual toilets are absent; only public toilets are located within the settlement or in the neighbouring areas for use.

The nature of work of its dwellers, the physical environment, and the social environment are the drivers of this research streamlining the concern towards health and health-related issues. Most of the dwellers work for daily wages and their nature of work in the municipal corporation includes sweeping, ragpicking, and clearing clogged drains. Apart from these, others work as domestic helps or assist in stores/commercial outlets. The lack of awareness in the use of and the need for protective gear such as the rubber gloves and safety shoes provided by the municipality, along with the discomfort they bring on considering the hot summers in Coimbatore, has limited the workers from using them and has, in turn, exposed them to innumerable forms of disease vectors. The temporary nature of the work instils stress, making them vulnerable to anxiety; as a result, many are susceptible to different forms of mental and physical disorders. In other words, the nature of the environment (home and work) may influence the risk of developing illnesses (mental and physical) that are largely associated with their lifestyle and habits—alcoholism, drug abuse, tobacco chewing, smoking cigarettes/beedis, etc. All the above form the first-hand information from the pilot study (through informal talks with the dwellers).

EXPLORATIONS INTO THE WELL-BEING AND THE PREVALENT ENVIRONMENTAL IMPACTS
ON THE HEALTH OF THE DWELLERS OF UKKADAM CMC COLONY
PART 2 – CONTEXT

The pilot study, as mentioned above, also included an interview with the local health officer (Figure 2.16), who described the livelihood patterns of the dwellers: The work schedule went on from 5 a.m. to 12 noon, beyond which the dwellers would seek other daily-wage employment. Alcohol was (mostly) consumed on a regular basis by them. Their shared culture bound them together as a community, but it could also divide them regionally within the settlement—based on the local deity that a household worships. It has also been observed that such

sub-religious groups have built temples as a shield from eviction or more so for one's territorial security, since demolition of a temple will not be passed by the regulatory bodies. The political systems are bound to the religious groups to a certain extent, thus creating strong interlinks which favour them during the local elections. Observations with respect to the integration of or even disparities between communities probably assist in understanding the social networks and interactions that, by and large, contribute to a healthy environment and healthy living.

Figure 2.14 and 2.15

Bird's-eye view of the settlement; The opportunistic encroachments



Figure 2.16

Interview with the local health officer



Figure 2.17

Pedestrian street in the settlement



While most of the dwellers who have been residing here for more than 40 years (specifically in the quarters and the housing complex), with strong economic interdependencies (work-related or moneylending activities) and social networks (within their own community or even with political heads), are now seeking landownership, the others are aware of their encroachments and the possibility of eviction, thus expressing their willingness to relocate to government-provided shelters.

Apart from a brief study on their livelihood and evident health risks, a detailed survey was conducted for inquiry and scrutiny, with an aim to stress on the predominant roots of the issues. It has to be noted that the introduction of the rehabilitation scheme instituted by the government or the housing schemes under RAY (presently PMAY) have been unsuccessful in curtailing the exponential growth of the settlement. Furthermore, the household survey conducted under RAY's Housing for All programme was opposed by the dwellers; thus, secondary data about the settlement was unavailable to a considerable extent. The failure of such policies will be touched upon in the subsequent sections. Overall, the methodology implemented for this case study is restricted only to health and health-related concerns with respect to the built environment and social environment—this will be detailed in the later part of the paper.

Course of the Research

Along with an overview of well-being and its relation to health, including the regulatory definitions (by WHO, OECD, or the UN) that guide in devising survey instruments, it is crucial to delineate, primarily, the determinants of health with respect to the context under study. The subsequent section is a brief literature analysis of the primary parameters of the study and the directives for survey methodology, both in terms of health and governance. This study streamlined a basis for the framework of the questionnaire, apt for the household survey, and also indicated the additional methods required for the triangulation of data along with the pilot study's inferences. An outline for the remainder of this paper is as below:

1. Outline inferences from literature review to focus and narrow down on health and its determinants;
2. Check on governance through government schemes and the decentralisation of its objectives;
3. Frame a research objective, scope, and indicate probable limitations;
4. Ideate for a methodology that would be apt for research, based on the inferences from the above-mentioned criteria. ♦

PART 3 PRE-STUDY

This Part provides an overview of the indicators considered for the survey. The knowledge acquired is directed at creating comprehensive methods to ascertain context-based analyses.

3.1 Health and its Determinants

As discussed in the above Parts, the determinants of health are an amalgamation of many factors. An individual or a community is primarily affected by their closest circumstances and environment, with health determining the well-being of an individual. The World Health Organization (WHO) outlines the parameters as follows: “To a large extent, factors such as where we live, the state of our environment, genetics, our income and education level, and our relationships with friends and family all have considerable impacts on health, whereas the more commonly considered factors such as access and use of health care services often have less of an impact. The chief determinants of health include:

- the social and economic environment,
- the physical environment, and
- a person’s individual characteristics and behaviors” (World Health Organization, 2017a).

Furthermore, the risks that develop from the above-mentioned factors are apart from an individual’s lifestyle and the same cannot be pointed out as a sole reason for ill health (**Figure 3.1**). To elaborate, the above determinants are sub-categorised as follows:

1. Income and social status

Ample income and social status are observed to be linked to better health. The term ‘ample’ is highly subjective; however, a broad comparison between the inflow of money to the expenses incurred gives

a framework that divides the richest and the poor and, thereby, delineates the probable ill health of the vulnerable. Furthermore, the relation between income and health can be fourfold:

- Materialistic in nature, i.e., more the money, better the social benefits and the ability and accessibility to buy goods/health-related products;
- Psychosocial in nature, where the stress of not having enough money can induce health issues;
- Behavioural in nature, i.e., the environment influences the behaviour of its dwellers, and the choice of environment depends on the income one makes;
- Income, to a large extent, is dictated by access to good education, good employment, and thus good health (Michaela et al. 2014).

2. Education

Good education and access to institutions have influenced health by building an individual’s self-confidence and have resulted in lower stress levels. Good education is directly linked to better income and social status.

3. Physical environment

Access to safe and clean drinking water, clean air, healthy workspaces, healthy home surroundings, good-quality built forms, and other infrastructure such as roads and community centres, all have a direct impact on health. The work and home environments are the chief parameters on which the dwellers have direct control over.

4. Social networks and support

Friends and family are the closest support systems to an individual, beyond which the support of help groups, community groups, NGOs, etc. can be

sought. Healthy relationships within the family, being close to culture (customs and traditions), and/or the activities of the community also affect health.

5. Genetics

The WHO prescribes that an individual's lifespan and the likelihood of developing illnesses are determined by one's genes. Furthermore, a person's behaviour, coping capacity when it comes to stress and life's challenges, and the interplay of individual habits such as maintaining a balanced diet, doing regular physical exercise, and avoiding alcohol or tobacco also dictate good health.

6. Health centres and services

Although one of the primary factors, access to basic health services is lacking in most parts of the developing world. Treatment and prevention of diseases is one of the most elementary expectations that the people of a country have from their governments. With the provisions of such centres, quality of care and affordability pose as sequential concerns for the centre's purpose.

7. Gender

"Men and women suffer from different types of diseases at different ages." Detailed surveys consider gender and age parameters for profound analysis (World Health Organization 2017a).

With the above-mentioned criteria, the cause for this research takes a stronger hold since the context under study—Ukkadam CMC Colony—evidently portrays aspects of crowding, unhygienic environments (both at work and home), and pollution (air, water, and noise). However, it is known that these factors are not unique to any urban environment.

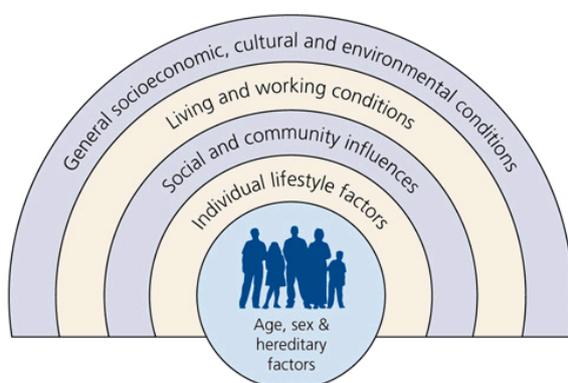
"The degraded environment in which they live takes a toll on the physical, mental and moral health of the slum dwellers" (Prasad & Singh, n.d., 1). A study in the highly dense slums of Mumbai revealed that the health status of dwellers is not only affected by the poor economic hold of a family, but also due to a lack of awareness and the unavailability/inaccessibility of healthcare facilities. A similar study in Brazil revealed a high occurrence of communicable and non-communicable diseases such as *"hypertension, diabetes, intentional and unintentional injuries, tuberculosis, and rheumatic heart disease and HIV infection"* (Prasad & Singh n.d., 2). Such conditions that spread across the urban continuums reveal a strong concern with respect to the survival of the low-income households.

The aforementioned determinants provided the basis for our questionnaire, when collecting data primarily on the existing socio-economic profile of the site under study. Additionally, indicators to determine aspects of mental health, accessibility to medical services, and lifestyle as a contributor to health behaviour, etc. are pointed out. Moreover, the occurrence and the dominance of particular diseases have been identified by the WHO to understand susceptibility to diseases as a consequence of crowding and unhealthy environments (physical and social), which, in turn, affects life expectancy, mortality, and morbidity rates.

Settlements such as Ukkadam can be designated as high-risk areas for disease transmission and, thereby, easy outbreaks of epidemics, thus demarcating themselves as the most vulnerable areas in urban precincts. However, it is important to validate this through the data collected.

Figure 3.1

Chief determinants that reflect the health of an individual



Source: www.globalhealthhub.org

Overlooked Facet: A Check on Mental Disorders

Beyond the aforementioned, what appears mostly ignored is a measure of mental disorders. It has been observed that the trends of urbanisation do not entail only demographic, social, and economic but also psychological changes. Stressors such as overcrowding, polluted environments, high levels of violence, and low social support have progressively contributed to mental health issues. The WHO has computed that 12 per cent of the urban population (in the global context) suffers from mental disorders; it has also recorded a high incidence of such issues among young adults. The Organization warns of the possibility of an increase in these numbers in the coming decades (Srivastava 2009). Some of the most common mental stressors include depression, substance abuse, anxiety, alcoholism, crime, family disintegration, and alienation. Financial problems, marital conflicts, interpersonal conflicts, and housing problems are also significant contributors to mental health problems. Dementia and depression are predominantly seen in developing countries, with an alarming estimate that there will be a 300 per cent rise by 2040 in its occurrence in countries such as India, China, and among South Asian and Western Pacific neighbours (Srivastava 2009). Varied community-based studies have revealed a lifetime prevalence of mental disorders ranging from 12.2 per cent to 48.6 per cent, with yearly prevalence ranging from 8.4 per cent to 29.1 per cent. “While increasing attention is being directed towards reducing the burden of non-communicable illnesses such as cardiovascular disease, cancer, diabetes, and chronic respiratory disorders in low- and middle-income countries, much less has been done to provide mental health services to tackle common mental disorders” (Travasso et al. 2014, 1).

The poor remain mostly prone to such adversities, becoming vulnerable to mental disorders. Anxiety and depression are enumerated to be predominant amongst urban women when compared to men, with socio-economic stressors that include mental

and physical abuse being the primary cause. Abuse is seen as an intimate-partner abuse (physical and verbal) and mostly linked to alcohol abuse by the partner (Srivastava 2009). Nevertheless, there exists very little research on mental health in slums. The existing limited research that concerns the occurrence, distribution, and control of diseases also reveals high rates of emotional stress in children and geriatric populations living in informal settlements. Dhaka’s slums saw a large adult population suffering from low mental well-being, which were attributed mostly to environmental issues at a larger scale than issues related to wealth. High numbers of suicidal autopsies in Mumbai’s slums have been linked to social stress (Subbaraman et al. 2014). “A few small-scale initiatives to provide community-based mental health services in India have been successful, but the need for well-designed and appropriately targeted services for a range of different population groups remains great. Filling this need will require evidence on both the triggers of poor mental health and the potential mitigators” (Travasso et al. 2014, 2).

3.2 Governance: India and its Health Schemes

Context

Many explorations have been carried out, specifically in the case of India right from the beginning of the 20th century, owing to its thick population and high risk of epidemics. “Urbanization broke down those traditional family and community structures and the working class in particular was pushed to the brink of destitution in a crisis such as an epidemic or a natural calamity. It was left to the state (primarily the political and administrative wings) to become the moral ‘parent’ of the poor” (Centre for Studies in Ethics and Rights, Mumbai, 2007, 113).

“In urban areas, the marginal increase in income for the poor, in itself, does not assure better living conditions due to wide disparities, which make decent accommodation and clean water and air unaffordable. Moreover, certain necessities, which existed

as free goods in rural settings, are commodities in urban areas such as drinking water, cooking fuel, housing space, etc. The poor are typically driven to the margins of the urban space, where living conditions are the most degraded and of little economic value” (Centre for Studies in Ethics and Rights, Mumbai, 2007, 113). Furthermore, studies regarding the urban population reflect that the health of the urban poor are far worse than that of their rural counterparts. Specific to the smaller urban towns, an evident void exists in urban healthcare services which is intensified by the rapid population growth and the consecutive increase in informal settlements (National Health Mission, Tamil Nadu, 2017).

What is strikingly evident is the existing disparity between the rich and the poor. The rich consume more public goods than their fair share, while the poor who settle on urban lands, as a result of migration, suffer penalties from the government such as being denied their right to housing, right to good infrastructure, and so on. Economic uncertainties make the informal settlements a focal point to strict actions such as relocation or resettlement, evictions etc., which increase deprivation, especially to those in casual-wage labour. Thus, it can be rightly stated and demanded that the states recognise their obligation to safeguard the rights of the poor against the irregularities of the market and the overwhelming influence of the rich. This scenario, i.e., the disparity between the rich and the poor, has been—to borrow from and add to Charles Dickens’s famous term—*the tale of two cities within a city*.

National Health Mission (NHM)

The result of such studies has led to the formulations of many policies at the national level, which are translated at the state level, and implemented by the local corporations. The framework of such policies begins with tackling poverty at the widest circle and trickles down to smaller goals such as health, education, employment, etc. One such policy is the National Health Mission (NHM), which has the

following vision: “Attainment of universal access to equitable, affordable, and quality health-care services, accountable and responsive to people’s needs, with effective inter-sectoral convergent action to address the wider social determinants of health” (Ministry of Health and Family Welfare 2014, 2). The core values aim. . .

1. “at securing and safeguarding the health of the poor, vulnerable, and disadvantaged with an aim of achieving right-based approach to good health through entitlements and service guarantees;
2. to strengthen public health systems to cater universal access and social protection against the rising costs of healthcare;
3. to build trust between people and providers of health services;
4. to encourage community involvement to achieve better health levels;
5. to institutionalize transparency and accountability in all processes and mechanisms;
6. to improve efficiency with optimized resources” (Ministry of Health and Family Welfare 2014, 2).

The goals of the Mission also dictate and propose objectives with regard to maternal mortality, infant mortality, women’s healthcare specific to the prevention and reduction of anemia, prevention and reduction of mortality rates resulting from communicable and non-communicable injuries, reduction in a household’s expenses on healthcare, reduction in the incidence of and mortality caused by deadly disorders such as leprosy, tuberculosis, malaria, and many others. Furthermore, the Mission dictates that the states must carry out these goals based on their independent capacities and contexts.

National Urban Health Mission (NUHM)

The NHM further branches out into the National Rural Health Mission (NRHM) and the National Urban Health Mission (NUHM) with objectives to provide accessible, affordable, and quality health-

care to the rural vulnerable and the urban poor respectively. The former was launched in 2005, while the latter saw its approval only by 2013 (Ministry of Health and Family Welfare 2014; National Health Mission, Tamil Nadu, 2017).

This case study concentrates primarily on the urban population, thus the explorations into the NUHM seem apt. The NUHM promises to achieve its goals of supreme healthcare to the urban poor through the following:

1. City-specific urban healthcare systems to tackle diverse healthcare needs of the vulnerable sections;
2. Managerial and institutional mechanism to meet the challenges of a rapidly growing and changing environment;
3. Community partnerships to encourage proactive planning, implementation, and monitoring;
4. A check on the available resources and their optimisation;
5. Partnerships with NGOs, healthcare providers (for-profit as well as not-for-profit), and other stakeholders (Ministry of Health and Family Welfare 2014; Gupta & Guin 2015).

National Mental Health Programme (NMHP)

The National Mental Health Programme (NMHP), under the NHM, has established activities at the district level to provide for psychiatric wards and specialised clinics for counselling. A team of experts, including a psychiatrist, psychologist, psychiatric social worker, and a pharmacist, was composed under this programme to assist those in need. Apart from this, the NMHP deals with autistic children, in partnership with NGOs. However, the specifics of mental disorders (as discussed above) seem unexplored by the NMHP (National Health Mission, Tamil Nadu, 2017).

Accessibility and Availability of Services

What seems striking is the evidence of the defi-

ciency in the healthcare services that cater to the citizens nationwide. Relevant studies prove this incompetence through a calculation of the number of health posts and welfare centres equipped to cater to the existing population. “Recent reports indicate that there are 1,083 Urban Family Welfare Centres (UFWCs) and 871 Health Posts (HPs) that cater to 377 million people living in the urban areas in the country. This translates to one UFWC/HP per 192,992 urban populations, compared to the norm of one center for every 50,000 persons, indicating severe accessibility issues. Other estimates indicate the need for an additional requirement of 500 urban health and family welfare centers to meet the current needs of urban poor” (Gupta & Guin 2015, 246). Thus, infrastructure provisions for such urbanising environments are strikingly inappropriate and inadequate; accessibility, specifically for the urban poor, remains lacking.

Decentralisation of Schemes at the State (Tamil Nadu) and City (Coimbatore) Levels

The Tamil Nadu government follows the State Programme Implementation Plans (PIPs), set forth by the NHM, by commissioning 280 Urban Primary Health Centres (UPHCs) in 114 municipalities and 21 panchayats. The city of Coimbatore houses close to 36 UPHCs (**Appendix 1**) under NUHM (National Rural Health Mission, Tamil Nadu, 2017).

When assessing Coimbatore’s commissioning of 36 UPHCs for an estimated population (Census of India 2017) of approximately 1.9 million, the number of health centres seems close to the standards specified (1.9 million / 50,000 persons = 38 health centres). However, the working and implementation strategies of these health centres on the ground seem to be unclear and ambiguous—enumerated in the later part of the study along with the survey results.

Discussion

Along with an overview of the determinants of health, the existing policies that cater to the promotion of

better health, the inadequacy in healthcare services, and the lack of awareness, availability, and accessibility of healthcare can be tested through site surveys.

What also needs to be questioned is the plausible psychological toll that the environment (both physical and social) can have on its dwellers. The aspect of environment and its influence on health is closely linked to the affect and effects of crowding. A major part of our pre-study included the concerns of crowding, as discussed below.

3.3 Crowding

It has been established previously that crowding has a considerable impact on health, primarily through an assessment of the quality of housing (one of the fundamental materialistic needs of humans). In this section, we discuss the varied connotations of this terminology and the relation of crowding factors on health (with respect to both physical and social contexts).

Definitions and Ambiguities

Crowding and overcrowding have been used synonymously and seem to portray similar negative connotations. The complexities involved in the definition of ‘crowding’ and in its usage have revealed several attributes that control the workability of its focus. It is important to relate to the effect of the context and the usage of the term, the nature and extent of its effects, the mechanisms or mediating factors that stimulate the effects, and, most importantly, the social and economic processes that give rise to crowding (Gray 2001).

The basis on which crowding measures are stipulated can carry a *normative*, *rational*, or an *instrumental* measure. The measure appears to be still unclear and rarely articulated. Also, crowding cannot be confused with density measures. It is, in fact, the psychological response of people’s perception on density, including the feeling of a place being crowded, its lack of privacy, the pressures of social interactions—exposure to others’ behaviours

and personal activities when more than two households share a roof and the lack of public spaces for socialising. The normative rationale behind its definition can sometimes overrule the social values to project a bureaucratic approach/implication with probable cultural biases. It is, however, crucial to understand that the workability of its measures changes with people’s economic conditions and social expectations.

An overview of its various definitions can be categorised as below:

1. Statistical definition

The measure is based on the occupancy rate, room occupancy, and bedroom occupancy rates. The occupancy rate is calculated by dividing the total number of occupants of all permanent private dwellings by the total number of occupied permanent private dwellings, whereas the room occupancy rate, as an objective measure, relates to the number of persons per room. One limitation to this involves the definition of a room which questions the housing layout, design, and utility, thus making it a subjective determination. The other limitation is the individual’s need for private space and the cultural definitions of the same. A ratio of one person per room is the prevailing standard in most European countries. Bedroom occupancy relates to the ratio of the number of residents to that of the bedrooms; however, there is no evidence of health issues being directly related to bedroom occupancy rates. The importance is rather concentrated on social acceptability, cultural values, and community expectations. An occupancy ratio of more than 1.5 to 2 persons per bedroom has been termed as crowding (Gray 2001).

2. Research definition

The person-per-room measure is commonly used by researchers, but not with complete substantiation. The standards adopted are as aforementioned—persons per room/bedroom. Furthermore, spatial measures have been suggested based on objective

observations of children as 90 sq. ft. per person; and, on subjective measures on satisfaction (of dwellers/residents) as 155 sq. ft. per person. This was devised after understanding the correlation between the occupancy of children per room and morbidity rates that were closely related to diarrhoea and respiratory diseases (Gray 2001).

3. Regulatory definitions

a. The United Nations

The regulatory definition by the UN-Habitat (UN-Habitat 1998) propagates the need for sufficient living area through the measures of occupancy in a dwelling or bedroom (as maximum three persons per habitable room). Area-level indicators are also specified in terms of the number of households per area and the living area per person in a house. Housing-unit-level indicators specify the number of persons per bed and the number of children under the age of five per room. On universal grounds, overcrowding measures have been considered based on the correlation between the number of persons per room and its impacts on health (United Nations Human Settlements Programme 2018).

b. World Health Organization

The WHO seconds the UN-Habitat's rationale that occupancy densities prove to be a risk factor for the increased transmission of a wide range of respiratory disorders. Measures of overcrowding, according to the WHO, can be considered in terms of the average living area per person. However, the living area's computation and definition remain ambiguous or unavailable in most cases. Thus, the indicator of overcrowding is generally expressed as the average number of people per dwelling unit. The ambiguities in assessment can be, however, dealt with, based on the probable precincts that the context offers. The expert committee on the Public Health Aspects of Housing and World Health Organization (WHO) states the following:

“One of the fundamentals of a healthful residential environment should be a safe and structurally sound,

adequately maintained, separate, self-contained dwelling unit for each household if so desired, with each dwelling unit providing at least the following:

- Sufficient number of rooms, usable floor area and volume of enclosed space to satisfy human requirements for health and for family life, consistent with the prevailing cultural and social pattern of that region and so utilized that living or sleeping rooms are not overcrowded.
- At least a minimum degree of desired privacy:
 - For individual persons within the household
 - For members of the household against undue disturbance by external factors
- Suitable separation of rooms as used for:
 - Sleeping by adolescent and adult members of the opposite sex except husband and wife
 - Housing of domestic animals apart from the living room of the dwelling unit.

These needs can be expressed in terms of space requirements to perform household activities and/or occupancy standards” (Gray 2001, 12).

4. Administrative definition

These streamline the measures in terms of housing needs (social, political, and economic dimensions) alongside the measures of affordability, accessibility, and adequacy.

With the aforementioned categorisation in the definition of crowding or overcrowding, it can be well established that the complexities of a society or context do not always provide for a unified definition on crowding based on regulatory models or housing needs standards.

Crowding and Health

The relation between poor housing conditions and health has been discussed for decades now. The fundamental proposition in this regard has two dimensions:

- I. How high levels of crowding can lead to stress and, in turn, lead to illness;
- II. The vulnerability to the quick spread of communicable diseases due to close physical proximity.

Furthermore, the complex and indistinctive (subjective) premises of the relationship between health and crowding reveal a series of variables such as housing conditions, physical environment (presence of dampness, cold, and mould), hygiene practices, access to healthcare; equally important are socio-economic factors such as income, employment, education, etc., as discussed previously. These factors form a starting point to the variables of measure and the design of a questionnaire relevant for the research survey (Gray 2001).

1. Health and housing conditions

The conditions of housing, i.e., the state of repair of a house, and health share a strong link. It has been established that changes or improvements in sanitation have reduced the dangers to physical health to a large extent; however, the threat to mental health persists with the perception of the utilisation of space, i.e., the lack of control over the available space. In addition to this, the housing type's impact on health portrays its relevance in terms of the experiences of people with cluster formats, high-rise formats, single units, terraced typologies, etc. The extent of the interrelationship and the interrelationship between interior and exterior spaces and the nature and the quality of facilities are also ascertained in analysis (Gray 2001).

2. Health and the social context

Ethnicity, medical history, age, education, and employment status are variables that are relevant to understand the influence within the household—in particular, the resilience attained within crowded conditions. Beyond these, accessibility to healthcare facilities, improved quality of treatment, and awareness within the community have a large impact on an individual's response to crowding.

3. Impact on physical health

Irrespective of the housing conditions and quality, it has been ascertained through many studies that high room densities have adversely impacted inhab-

itants' physical health. The occurrence of infectious diseases, especially chronic respiratory disorders and gastrointestinal complications, is high when the levels of overcrowding are high too—the high occurrence is attributed mainly to poverty and a lack of nutrition. Other factors that can be categorised under 'high risk' or 'high intensity', as the effects of overcrowding, are as follows:

- i. Increased potential transmitters of multiple infections;
- ii. Increased disease transmission due to proximity;
- iii. Early-age attack of chronic infections influencing life expectancy and morbidity;
- iv. Prolonged illnesses and long-term adverse effects of infections.

Studies attempting to relate the direct effects of the aforementioned factors have been few compared to the research on the relationship or the association between crowding and the spread of infections. The relative factor here is the susceptibility of the community to the adverse effects of overcrowding.

Respiratory disorders have been linked to ratios such as person per room as well as children per household. Poverty, poor environment, and poor nutrition have been associated with an increased number of cases in tuberculosis. Furthermore, explorations in child health and behaviour reveal other dimensions to the correlation between health and overcrowding (Gray 2001).

4. Impact on mental or psychological health

The ambiguities in the outcomes of various research studies highlight the lack of evidence in the materialistic influence of overcrowding on mental health and/or of how overcrowding stunts the quality of life. The research has been along two dimensions: first, the subjective perceptions of crowding and its impact; second, the clinical measures of mental health as opposed to self-reporting or measure scales adopted by the researcher. Mental or psychological distress, however, has been associated with such factors:

- i. Extent of social contact/interaction (wanted or unwanted)
- ii. Privacy measures
- iii. Check on child behaviour
- iv. Frustration due to unfulfilled simple goals such as eating or watching television
- v. Use of available facilities within the household
- vi. State of being oblivious to good care

Stressors may give rise to interpersonal aggression, social detachment, withdrawal within family, etc. With devised measurement scales incorporating factors such as mental health, social relations within the home and outside, childcare and physical health, it has been concluded that crowding results in the following:

- a) “Physical withdrawal, psychological withdrawal, a lack of general planning behavior and a general feeling of being washed out” (Gray 2001, 25)
- b) Poor social interactions
- c) Poor childcare
- d) Helplessness

Subjective aspects of crowding perceive the “comfort scale” (Gray 2001, 25) through measurements of dilapidation, climate control, presence of pests, and dwelling-related risks and vulnerabilities.

Discussion

Although positive connotations of crowding include an exposure to enhanced social interactions, they mainly refer to situations outside the dwelling. Crowding and its relation to health can be positive too, in terms of stimulating the immune system from viral infections which could have a protective effect from other infections. However, research to substantiate this is limited. Crowding and its association with illnesses remains robust in establishing its causality, but the social processes and their impacts strengthen this relationship to a considerable extent. Thus, cross-sectional studies have been conducted to ascertain lifestyle practices, along with studies on ethnicity, socio-economic contexts, and their impacts on health.

In this research, the aspect of joint families still exists—considering it is still a part of the social context of India in general, be it amongst the high-income groups or the low-income groups. Irrespective of the high-density profiles, the quality of housing is ascertained to analyse the relation between the built environment and health (both physical and mental) to reveal probable vulnerabilities to infectious diseases, which, by and large, have an impact on morbidity and mortality rates.

3.4 Inferences from the Pre-study

Firstly, the determinants of health provide for a streamlined formulation of the questionnaire to understand the socio-economic profile and its direct impact on health.

Secondly, with an overview of the health schemes proposed by the central government of India and its decentralisation at the state/city levels, it is important to check the availability and accessibility of such services at the site level. Affordability concerns also need to be highlighted. It has been pointed out that mental health has been an overlooked facet, even in the central-level schemes, in order to cater to the disorders arising from environmental stressors (physical and social).

Thirdly, crowding concerns, with respect to the environment, have largely been associated with negative impacts on health. A measure of the impact of crowding in the context of Ukkadam CMC Colony is thus advisable.

The research objectives should thus branch out of the pre-studies, delineating the probable concerns applicable to the context, and aim at providing a guidance tool for directive measures and/or a starting point for further researches. ♦

PART 4

RESEARCH OBJECTIVE, SCOPE OF THE STUDY, AND METHODOLOGY

The Gamut of Research

We commenced this report with an introduction to the concept of well-being and its relation to health. With a generalised scenario of the growth of informal settlements in India and an outline of Coimbatore city's profile (dealt earlier), the specificities of the Ukkadam settlement were highlighted, based on the pilot study conducted.

The context: CMC Colony is named so because of the settlement of the Arunthathiyar clan who are mainly involved in scavenging work for the Coimbatore Municipal Corporation (CMC). A brief into the socio-economic profile of Arunthathiyars necessitated an inquiry into the impacts of the environment on health—the slum dwellers of CMC Colony have been chosen through physical observations of their unkempt surroundings that expose vulnerabilities in terms of both their work and home environments. The study of the Ukkadam settlement is, to a large extent, a representative of the scenario in a majority of such settlements spread across the city. The scale of vulnerability is probably the only distinguishing factor between these settlements.

An exploration into the health status, as an indicator of well-being, is assessed as a measure of illness that works at both the somatic and the psychological levels. An assessment of the illnesses that prevail and add to the susceptibilities of its people became the crux of the research. Lifestyle practices were considered as a factor of well-being through an assessment of developmental and social processes within society that variate the mental and physical health statuses.

Physical and social environments that affect health have been operationalised to identify indicators of measure.

The typologies of housing were mapped to understand their approximate areas. The average household size was determined through the survey. With these indicators, the number of people per habitable room was computed to conclude what constitutes overcrowding and further comment on the risks it imposes.

The Objective

A framework sketched to elaborate on health and its factors, a review of the existing health schemes and their realisation at neighbourhood levels, the need to explore mental health conditions, and, most importantly, the evident scenario of the conditions of physical infrastructure and a daunting social environment (from the pilot study)—all these created a need for this research with objectives as below:

1. To explore the root causes of the poor living environment of the slum that affects the health of its dwellers;
2. To provide elaborations on context-based specificities that impact health, and thereby explore the degree of vulnerabilities that each indicator imposes.

Limitations and Possible Hurdles

- a) A case study restricts the scale of generalisation. The problems witnessed may not be applicable to a settlement located in other states/countries, nor even to those within the same city.
- b) Availability of secondary data: Since Coimbatore is a Tier II city, the dynamics of urban systems are still being recorded. The availability of a strong database to conduct such surveys might be lacking.
- c) Issues that arise from choosing the apt survey hours.
- d) Locational restrictions or denial from the dwellers to share information.
- e) Possibility of human error: Survey inputs can be prone to a certain degree of human error.
- f) Possibility of unintended error by the research team: Unfavourable survey results may be the consequence.
- g) Gender-based issues were not considered.

Methodology

A case study, as such, finds a stronghold as a research technique because it dictates mixed methods of procuring data to thereby achieve triangulation of data. This strengthens the case since both qualitative and quantitative approaches are carried out. In the case of Ukkadam CMC Colony, given the premise of the pilot study and the pre-studies, the ways of procuring operationalised data was planned to include the following:

1. Observations of the physical environment;
2. Individual household surveys (to procure and validate socio-economic profile, lifestyle, and mental stressors);
3. Setting up a free health camp (as an entry point to gain the trust of the dwellers and procure sensitive data on health behaviours);
4. Focused group discussion with the dwellers (to highlight and stress on the degree of vulnerability through factors of high concern within the context).

The above-mentioned methods and their findings are elaborated in **PART 5**. ♦

PART 5 DATA COLLECTION AND FINDINGS

5.1 Physical Environment: Observations

Observations of the physical environment have been, to a large extent, covered in the pilot study. The site survey conducted between the April 26 and April 28, 2017, demonstrated a factual outlook to provide assertions to the pilot study's inferences. A report on the site survey, explaining the proceedings, is attached at the end of this paper (**Appendix 2**).

Housing Typology and Quality

The primary findings of the study on built environment are highlighted below:

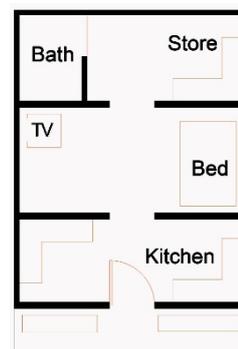
1. The predominance of semi-pukka houses (masonry walls and tile/sheet roof) and the justified categorisation of a dilapidated housing complex as semi-pukka can be elucidated as a characteristic of the built environment for Ukkadam CMC Colony.

During the site survey, spontaneous sketches were made of the predominant typologies in the settlement.

a. The *quarters* were located close to the main streets (National Highway 209 and Street No. 7). These were comparatively large in area (100–120 sq. ft.) and provided with independent toilets. A small foyer was placed at the entrance, furthered by defined areas for the bedroom, kitchen, and bath (**Figures 5.1 and 5.2**). The entrance is the most important source of light for this typology. It is left open depending on what time of the day it is; to light up the inner rooms, some dwellers have punctured the roof and covered it up with a plastic sheet or glass. Approximately 15 per cent of the settlement's houses are of this typology.

Figure 5.1; 5.2

The bedroom and kitchen door in the quarters ; Schematic plan



b. The core regions of the settlement included the individual *single-room typology* with the maximum dimensions—10'x10' (100 sq. ft). This room was partitioned to contain a small bath area and a kitchen counter. This typology housed an average family size of five members. The houses were either tile-roofed or sheet-roofed. The dwellers

used the public toilets located at the beginning of the settlement, adjacent to NH 209 (Figures 5.3, 5.4, and 5.5). Here, the main entrance is the most important source of natural light with a small window being located beside the main door. Nearly 60 per cent of the dwellings in this settlement belong to this typology.

Figure 5.3; 5.4; 5.5

Wash area; Kitchen space, Schematic plan

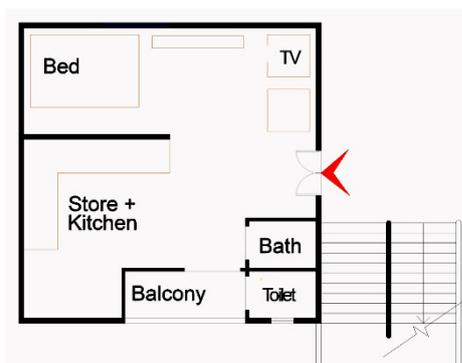


c. Another evident typology was the *housing complex* (apartment complex) of three floors, built decades ago by the housing board (government). The plan included a partition wall between the kitchen and the living room/bedroom. A bath area and a toilet attached to the balcony is seen—the orthodox Indian housing typology dictates the location of

toilets, i.e., preferably outside the living premises (Figures 5.6 and 5.7). In this typology, two sources of natural light are evident—one is the balcony and the second is the window in the bedroom, so the main door is mostly kept shut to maintain privacy. Approximately, 20 per cent of the settlement's houses belong to this typology.

Figure 5.6; 5.7

The living and storage areas; Schematic plan



Source: KAHE

d. The other typology included a *two-floored, G+1 building* with one to four tenements on each floor. Several two-floored buildings with a single tenement per floor

were also located. With an additional floor, this typology was an adaptation of the quarters; it approximately accounts for the remaining 5 per cent of the settlement.

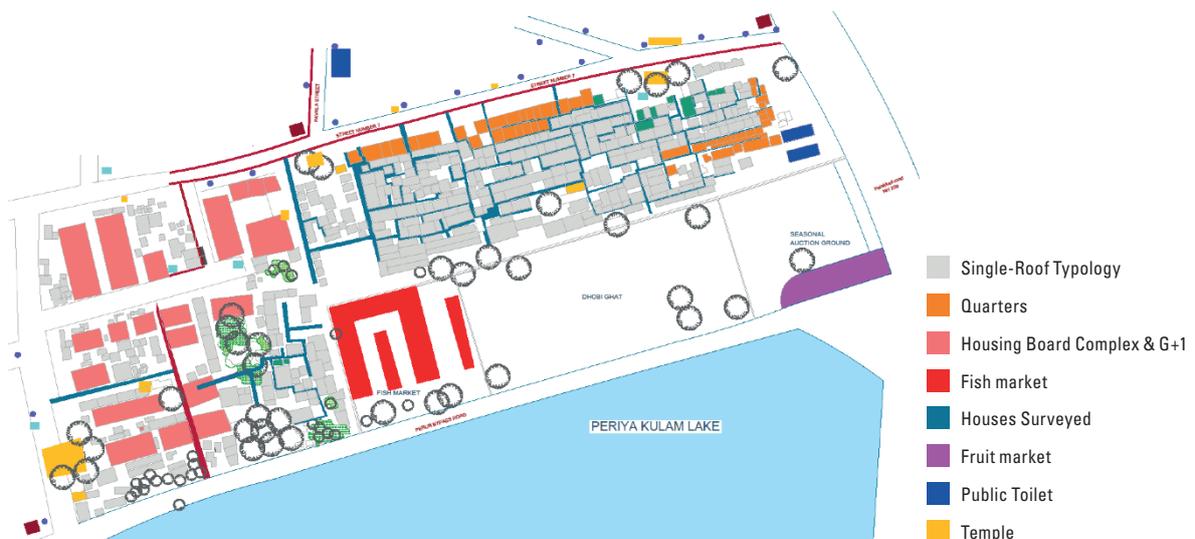
Figure 5.8

Bird's-eye view of the four housing typologies existent in the settlement



Figure 5.9

Plan showing the four housing typologies in the settlement



Source: KAHE

The classification of the building typologies (Figures 5.8 and 5.9) and a brief exploration into their interiors revealed an unkempt appearance. All four typologies have adopted unique methods to let in natural ventilation and light. The quarters and single-room typologies mostly depend on the main door for ventilation, which forces them to keep it open during most part of the day. Although ventilation or natural light doesn't seem to appear as a primary concern (in these typologies) with respect to health, the inhabitants' privacy and security are at stake. The housing complex, however, portrays sufficient ventilation, with the closed main door offering privacy and security.

Crowding within the housing typologies is a concern, though, for it may increase one's susceptibility to illness. The lack of or poor lighting and ventilation and proximity concerns due to overcrowding, together, may add to the inhabitants' vulnerabilities. This aspect will be elaborated on through the household survey data to correlate the household size or family size with their habitable areas.

Study of Immediate Surroundings

The immediate surroundings were observed; the individual household surveys, which were conducted analysed and reinforced our observations of the surroundings. The causative factors for the squalor inflicted by their physical environment can be highlighted as follows:

Firstly, the presence of markets along the peripheries seem to be a blot on the area, in turn affecting the sanity of the dwellers. The fruit market along NH 209, a wholesale vegetable market on Street No. 7, and a fish market which adjoins the Perur Bypass Road to its south and the settlement to its north—on the one hand, while these markets add to the vivacity of the area, on the other, they are significant contributors of heaps of garbage found discarded in the area. Figure 5.10 shows the location of municipal waste-collection bins around the settlement. With the settlement being situated close to dump yards (Figures 5.11 and 5.12), it is a breeding zone for var-

ious diseases—a matter that has been indicated as a huge concern by the respondents during the survey.

A lady living near the garbage dump of the vegetable market said, *“Waste is thrown here and there. This is one major reason why children are contracting illnesses, especially fever. We have complained to the municipal corporation several times; we have also given written complaints requesting them not to keep dustbins in the vicinity as they are not emptied and cleaned regularly. See that child sitting and eating food very close to the dustbins... What does that child know? The market's waste is also thrown here although separate dustbins have been placed behind the market. We have already informed the authorities about these issues so many times, but they don't take it seriously at all. Corporation workers staying in this area say that they will see only whatever is their priority (sic). So, they will attend to the problems of better housing areas and cleaner areas. They are not bothered about how much harm these unhygienic situations can cause to the inhabitants. The people living here clean these areas, but only when they get orders from the corporation heads.”*

Clearing of the garbage heaps is done once every day, mostly early in the morning, by a tipper that delivers the collected waste to the Vellalore waste-segregation zone. A resident confirms, *“There are dustbins kept at every corner, where people drop their respective waste. The corporation workers collect the waste from these dustbins, ferry it on a pushcart, and then in a lorry that's waiting outside. The market's waste is also taken to the same dump yard in Vellalore.”*

Irrespective of the regular clean-up, the frequency (i.e., once per day) seems to be insufficient, considering the volume of waste being dumped. Garbage collection by the tipper too seems inefficient with some volume of the waste being left behind in the settlement's dustbins. Throughout the day, as garbage continues to be thrown from the markets, stray animals such as cows, dogs, goats, and pigs frequent these bins. These then act as secondary channels for the spread of diseases.

The markets’ effect on the sanity of the dwellers can be primarily understood through the unpleasant odour that continuously fills the air due to the garbage heaps and the fish market in the area. Air pollution is aggravated not just by the garbage, but also by vehicles, since the settlement is located in the midst of some principal roads. The Palakkad Road (NH 209) has heavy traffic throughout the day, especially during peak hours, with buses plying to and fro from the Ukkadam bus stand, and

private vehicles leaving and entering Ukkadam. The Perur Bypass Road witnesses congestion with trucks coming from Kerala to load/unload goods at the fish market (from 4 a.m. to 6 a.m.) and at the fruits market in the afternoons, and also with the municipality waste-collection trucks coming and leaving between 7 a.m. and 8 a.m. every morning. Furthermore, the open drains (discussed below) in the area also add to the issue of unpleasant odour that lingers over the settlement.

Figure 5.10

Plan showing municipal waste-collection bins around the settlements (Appendix 7)



Figure 5.11

The waste dump near the fruit market



Figure 5.12

Garbage truck collecting the vegetable market’s waste



Source: KAHE

The *second* chief factor affecting the surroundings comprises the open drains that run along the settlement's tiny streets, where, in some cases, the drain paves the path to a house (Figures 5.13, 5.14, and 5.15). The settlement finds itself located on untenable wetlands, with the exception of, probably, the housing complexes that have been provided by the government. Hence, predetermined drainage systems are completely absent. With rising encroachment, the drainage issues have doubled. Stagnation of drain water is

evident in most parts of the settlement. An absence of or rather unplanned slopes for the flowing drain water are the root cause for stagnation, specifically in the interior zones. The peripheral drains or the slightly wider drains have slopes that facilitate a minimal drift of the sewage. However, this drift is still insufficient, so the drains act as breeding grounds for water-borne diseases. Subsequently, the presence of such stagnation at several places also adds to air pollution through the odour it emanates, thus causing discomfort.

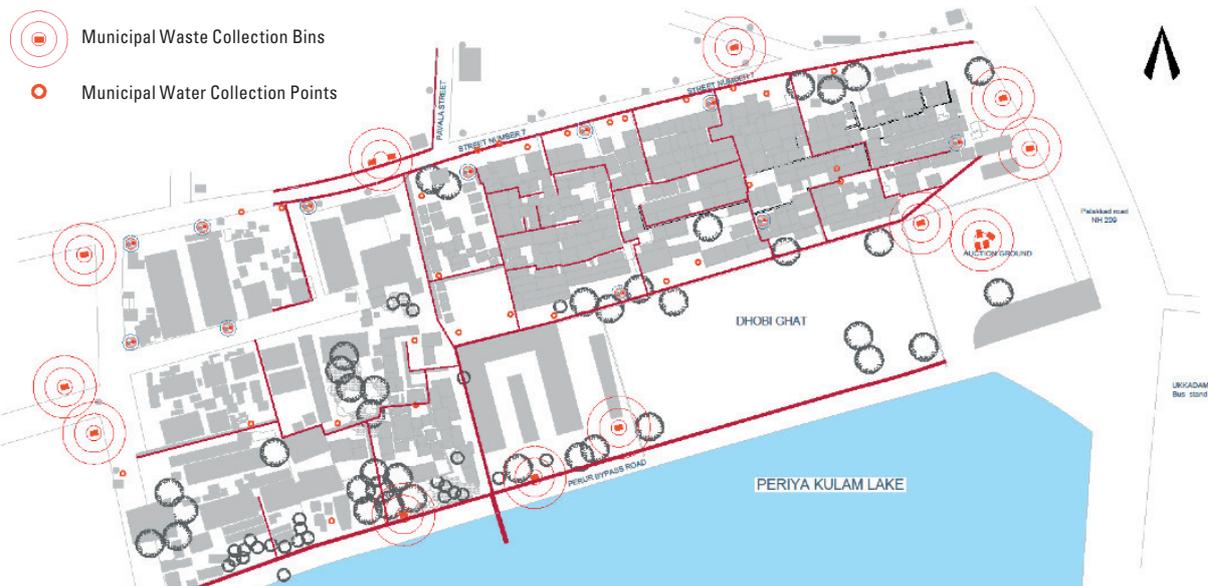
Figures 5.13, 5.14 and 5.15

The open drainage along the tiny streets in the settlement



Figure 5.16

Plan showing drinking water and water-collection points, along with the drainage layout, in the settlement (Appendix 8)



Source: KAHE

The *third* factor involves one of the most important indicators for a better quality of life, i.e., access to clean drinking water. Borewells within the settlement provide water for general use (bathing, cleaning, and cooking). However, even this basic necessity is made available to the people on a rotational basis, i.e., a set number of families are assigned each day for the collection of a limited quantity of water from the borewell. Drinking water is provided once a week (from Saturday evening to Sunday night). Even if the water supply might seem sufficient, a limit on the quantity of water collected is necessitated by a lack of space within houses to store the collected water. Moreover, what seems alarming is that the location of the water-collection points (in this case, the common tap provided for each street) is right beside the open drains, which may add to the risk of an individual’s susceptibility to quicker trails of disease-carrying pathogens (Figures 5.16 and 5.19). This vicious stream of activities (for example, cleaning vessels) close to the drains—which, in turn, simultaneously adds to the already stagnant water—increases the dwellers’ vulnerability.

The dwellers are also witness to the overflowing of the drains during heavy monsoon. Vulnerability to such shocks are to be measured for quick responsive action.

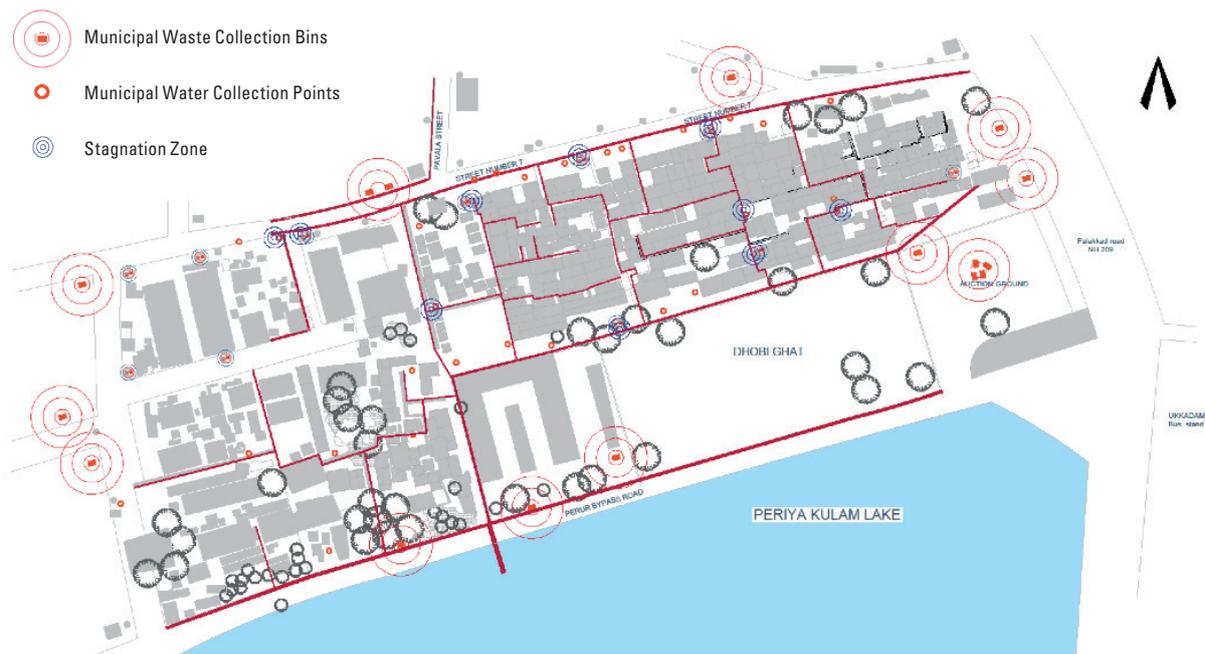
Figure 5.17 and 5.18

The water-collection points right beside the open drains



Figure 5.19

Plan showing the stagnation zones in the settlement (Appendix 9)



Source: KAHE

Fourthly, the sewage from the settlement is presently being directed towards the Periya Kulam Lake (Figure 5.19). With routine fishing activities taking place in the same place, the pathogens now get carried through by the aquatic life (Figures 5.20 and 5.21). The sale of these disease-infested fish and other creatures is not restricted to just within this settlement, but also happens in other parts of the city, thus spreading the pathogens further.

Figure 5.20 and 5.21

The sewage line directed towards the Periya Kulam Lake



Lastly, the common toilets located at the northern and the eastern ends of the slum (Figure 5.9), and the low maintenance of the same, pose a concern (Figures 5.22 and 5.23). This has been raised as an issue because usage of one of the common toilets located within the settlement is restricted (based on time), thus forcing the dwellers to use the toilet located outside, at a distance from the settlement. The urinals provided within the common toilets remain locked, with many dwellers then resorting to public urination.

The frequency of maintenance of these facilities (once per day, by the corporation) is inefficient, considering a population of more than 4,000. The toilets then become another medium for infections. The percentage of households having independent toilets are fewer than those relying on the common toilets. Hence, the issue of their accessibility and maintenance is crucial.

Figure 5.22

The common toilets in the settlement



Likewise, beyond all the evident squalor in the physical environment, other miscellaneous infra-structural lags can be attributed to the following:

1. Congestion on the roads with the markets' activities and vehicular movement have been expressed as a concern, in terms of the safety and security of children, by the residents.
2. In such conditions, crowding within households, with a family size of 3–5 members residing in an area of 100 sq. ft., speeds up the spread of communicable diseases. This will be elaborated on, along with the findings of the household survey, below.

5.2 Household Survey

With a rudimentary analysis on the built environment and its immediate surroundings, the primary health concerns of the dwellers required a firm standing with technical backing. The household survey constituted a comprehensive questionnaire encompassing the following parameters:

1. Demography (family size)
2. Education level, occupation, and income level
3. Access to and quality of infrastructure (water, drainage, toilets, etc.)
4. Lifestyle and social networks (qualitative in nature)
5. Health (visits to the health centres, their access and availability, type of health centre—private or government, health loans and insurance, and determinants of mental stressors).

These primary parameters would paint an overall picture of the settlement. A model of the questionnaire is attached at the end of this paper (**Appendix 3**).

Survey Sample

The Tamil Nadu Slum Clearance Board (TNSCB), in its Slum-free City Plan of Action 2013–2022 (SfCPoA), under the Rajiv Awas Yojana (RAY)—presently called Pradhan Mantri Awas Yojana (PMAY)—conducted a survey with the assistance of the National Institute of Technical Teachers Training and Research, Chennai. This survey’s report entails a detailed analysis of the informal settlements that fall under the Coimbatore Municipal Corporation’s limits. The demographic details in this report reflected a total of 779 untenable households living on objectionable land in the Ukkadam settlement, CMC Colony, the area of our research. However, a strong opposition from the dwellers proved to be the greatest shortcoming for TNSCB’s survey, with 768 households being excluded from it. With this secondary data of 779 households, a random sample of 100 was picked for our survey (which meets the standard requirement of including 10 per cent of the total households for a survey). The nature of the survey sample was not restrictive to gender or age group; however, purposeful sampling was done, based on the identified typologies in the built environment, i.e., internally-located, single-floor, 100-square-foot households as well as the housing complex.

Furthermore, to establish a firm hold on the total number of households, considering the exponential growth in encroachments observed, a crude mapping exercise was conducted by the survey team; the results revealed an approximate total of 1,013 households⁶. Even so, a survey sample comprising 100 households remains justified.

The Survey and the Survey Team

A survey team, headed by Veerasamy and Sumathi, with an average of six surveyors per day, was appointed. The team was briefed about the survey methodologies and the indicators included in the questionnaire. A brief report on the site survey has been attached as **Appendix 2**.

Table 5.1

Total entries for each data-collection methodology

METHODOLOGY	ENTRIES
Household Survey	107
Health Camp	70
Focused Group Discussion/Participatory Rural Appraisal (PRA)	13
TOTAL	190

6 From the time of the TNSCB’s survey (when 779 households lived in the settlement) to the day of our survey, we have mapped the growth of the settlement to comprise approximately 1,013 households.

Survey Findings

The independent household survey, with a total of 107 respondents⁷, highlighted the following:

1. Demography

The demographic constituent of family size predominantly appears to be around four members per household. The typologies of houses have been dealt with earlier, based on which formative conclusions of the individual survey can be drawn.

Table 5.2

Average size of family

FAMILY SIZE (NO. OF PERSONS)	ENTRIES	PERCENTAGE (%)
0–2	20	18.7%
3–5	65	60.7%
6 and above	21	19.6%
No record	1	1.0%
TOTAL	107	100%

With a majority of the population falling under the category of 3–5 members per household, and considering that a mere 100 sq. ft. is the area of a typical house, a high percentage of crowding is evident. Also, a family size of 6 and more members was considered in the analysis to decipher the degree of crowding, considering the habitable areas (amongst all identified typologies) was a maximum of 180 sq. ft. With regulatory standards specifying a minimum of one habitable room per person and a maximum of three persons per habitable room (UN-Habitat), our findings seem to be a serious concern in this context. Moreover, the factors contributing to various illnesses have been stipulated by WHO (discussed in PART 3) as a negative effect of crowding; in the case of Ukkadam CMC Colony, these factors can be identified as significant mental stressors.

⁷ Although we had planned for 100 respondents to be included in this study, we succeeded in involving 190 respondents (inclusive of all methodologies); 107 respondents participated in the independent household surveys.

The education level and consequently the employment type can be explored to measure another chief determinant of both physical and mental health. The following tabulations provide an overview of the education level and employment type:

Approximate number of respondents

(population of 107 households): 430

Number of children and adult population

(excluding those below 5 years of age): 400

Table 5.3

Level of education among the dwellers

EDUCATION LEVEL	ENTRIES	PERCENTAGE (%)
Primary (Grades 1 to 4)	212	53.0%
Secondary (Grades 5 to 7)	62	15.5%
High School (Grades 8 to 10)	32	8.0%
College (Grades 11 and 12)	26	6.5%
Specialisation (UG and PG)	0	0%
No education or no record	68	17.0%
TOTAL	400	100%

2. Level of education

More than 50 per cent of the population has completed only primary education, which seems to validate the job profile (that of a municipal worker) predominant in this settlement. The percentages drop for secondary and high school education, perhaps portraying a high drop-out rate from schools in this stage. The socio-economic profile of the Arunthathiyar caste, discussed earlier, is also justified by the records mentioned above. This can probably be attributed to the mindset of the children that weighs the desire to earn to be more significant than learning. The economic instabilities within the families may probably drive their choice or the need to earn and be independent—an outlook which sets in at a quick pace in such settlements. Ironically, the educational institutions that most children go to are of good quality and mostly privately owned. This may indicate an interest in good-quality education by the dwellers. Ease of access and admissions have been considered as minor issues by the dwellers (see **Focused Group Discussion**).

3. Employment type and income

The below-mentioned table explores the employment type of the interviewed dwellers:

Table 5.4

Nature of employment of the dwellers

EMPLOYMENT TYPE	ENTRIES	PERCENTAGE (%)
Corporation workers (CMC)/daily-wage workers	87	54.0%
Other government workers such as peons, clerks etc	3	1.9%
Workers employed with the private sector	16	9.9%
Self-employed, skilled workers (domestic help, carpenter, painter, electrician, driver, tailor, etc.)	50	31.1%
No record	5	3.1%
TOTAL	161	100%

Total working population: 161

Approximated to 1–2 working person(s) per household

The municipal workers are daily-wage workers (with around 40 per cent having permanent jobs at the municipality and the remaining 60 per cent working temporarily), with a salary scale ranging from Rs.5,000–Rs.7,000 per month. Savings are a major concern amongst the dwellers (see **Focused Group Discussion**).

Affordable infrastructure such as electricity, TV cable connections, transport, medical aid, etc. is a matter of concern, considering the family size. Self-help groups present within the settlement help in local financing and the provision of loans, with at least Rs.2,000–Rs.3,000 being spent by borrowers as monthly interest. Also, with the aspirations of most dwellers to send their children to good educational institutions, the aspect of savings might be hampered. The temporary nature of their employment and the instabilities in their economic profiles may contribute to mental stress and, in turn, affect health. Beyond the apparent employment type (the corporation workers), a good 30 per cent of the

working population in the sample appears to be a part of a workforce that serves as domestic helps and other service-oriented jobs. In addition to these, the dwellers aspiring for government jobs are required to pay a deposit of Rs.1,00,000–Rs.2,00,000, which is highly unaffordable for them; the socio-economic mobility of the dwellers remains restricted, mainly due to caste-related differences. Hence, they are continuously on the hunt for alternate sources of income.

4. Quality of environment

Having an overview of the education levels, the prevalent employment type(s), and their income, it is now crucial to analyse the verities of their work environments. Also, a general impression of the home environment—ventilation, lighting, and crowding (elaborated on in previous sections) has been assessed through physical observations. With a majority of the dwellers working as scavengers and the apparent risks involved in this job profile, it was necessary to scrutinise their work environments, i.e., accessibility and provision of safety/working gear. Consequently, the respondents were instructed to choose between the quality of their home and their work environments, to help us scrutinise either or both as the source of ailments.

The results were as follows:

Table 5.5

Comparison between the quality of the home and the work environment

PARAMETERS FOR COMPARISON	ENTRIES	PERCENTAGE (%)
Home Environment	9	8.4%
Work Environment	35	32.7%
Both	57	53.3%
No record	6	5.6%
TOTAL	107	100%

With more than 50 per cent claiming that both their home and the work environment pose equal threat, quick remedies to achieve a safe and clean environment are the need of the day. To restate, the working gear (rubber boots, gloves, and masks) provided by the corporation to the workers have been underutilised for varied reasons: discomfort in wearing the gear and working for long hours; discomfort caused by the gear’s material, given the weather conditions in Coimbatore; and sometimes, a plain lack of awareness about its utility. This makes them susceptible to water- and air-borne diseases, further turning them into carriers of ill health into the settlement.

5. Mental health

In the context of the basic health determinants such as income, education, and environment (discussed above), the sources of mental stressors were analysed. A predetermined list was framed, with enough references from literature. The questions posed to the respondents involved qualitative or rather indirect ways of determining the factors. They were asked to reveal the constraints in daily life that added to anxiety and tension. The results are as follows:

Table 5.6

List of concerns in daily life that add to mental ailments

MENTAL STRESSORS	ENTRIES	PERCENTAGE (%) BASED ON A TOTAL OF 107 RESPONDENTS
Job Security	28	26.2%
Food Insecurity	73	68.2%
Physical Disabilities	18	16.8%
Poverty-related Stressors	77	72.0%
Loans/Debts	58	54.2%
Lack of Space	80	74.8%
Rodents	87	81.3%
Political Issues	12	11.2%
Fear of Eviction/Demolition/ Fire Accidents	4	3.7%
Police Harassment	45	42.1%
Future Aspirations/Goals	46	43.0%

Major concerns that can be highlighted with the above table is that the menace of rodents, specifically rats, is an alarming issue. The major drawback of these indicators includes a significant relationship between poverty-related stressors and other factors, since most of them (loans/debts, lack of space, food insecurity, etc.) are all a consequence of poverty. These also fall under primary concerns that affect the peace of the household. However, it is essential to understand their scale of importance to analyse the high degree of concern. Poverty compels them to compromise on built environments and surroundings, leading to bigger issues such as disease-carrying agents—rats. Lack of space or crowding, as highlighted previously, causes mental tension and psychological effects such as poor social interactions, privacy-related concerns, frustration, etc.

Anxiety arising from having to clear loans and debts was reported by more than 50 per cent of the respondents. Furthermore, issues of police harassment and future aspirations such as saving money for marriage, higher studies, etc. account for anxiety among more than 40 per cent of the respondents. Overall, the contributing factors to anxiety, which may grow into depression and other forms of mental strain, exist and are predominant in this settlement. Contrastingly, the fear of eviction, one of the primary triggers for mental stress in such settlements, seems to be the lowest-ranked issue in Ukkadam. This frames an interesting observation to assert the confidence of these dwellers who are rebellious to the government’s plans of relocation or even redevelopment. As mentioned earlier, the TNSCB’s approach to survey Ukkadam (under SfCPoA) remained futile due to the strong opposition by the dwellers.

6. Social security

The close-knit social relations and community interactions, for decades, have helped in achieving a sense of social security within the settlement, amongst the dwellers. This sense of security indicates the support systems available within the settlement

for medical aid or during any alarming situations (crime, death, accidents, etc.). The construction of temples dedicated to the local deity restricts the government officials from evicting the dwellers. On the flip side, it was observed during the survey that the subcategorisation of caste (based on the local deity worshipped) seemed to divide the dwellers, which affected the participation in the health camp (discussed below). We also noticed that caste-based differences are observed on a large scale even today with the fish market or the dhobi ghat disallowing employment opportunities (or inter-occupational mobility) for dwellers belonging to castes other than theirs in the settlement.

7. Awareness of government schemes

The awareness about government schemes was evaluated to outline the success of the schemes of the National Health Mission (NHM). With scrutiny into the insurance schemes, it was found that the TNSCB has a health insurance scheme⁸ specifically for the Ukkadam dwellers. Although 55 respondents (51.4 per cent of the sample) were aware of the scheme (specified as “government insurance scheme” by the dwellers), only 9 of them claimed to have availed themselves of the scheme’s health-related benefits. In the settlement, it has been observed that self-help groups such as Dhanalaksmi and L&T assist in setting the interest rates. As mentioned earlier, a monthly expenditure of Rs.2,000–Rs.3,000 makes saving a near impossible task. Evidence of city-level health programmes or health camps were close to nil. The dwellers have validated the organisation of only maternal care camps within the slums by the government. However, a clear record in this concern is unavailable at the public health centres.

⁸ The health insurance scheme to provide healthcare assistance to the employees of government departments, state public-sector undertakings, statutory boards, local bodies, state government universities, and their eligible family members. For more information, please see http://www.tnscb.org/wp-content/uploads/G.O.Ms.No.202_2016.pdf.

5.3 Health Camp

With a prior indication of the dwellers’ opposition to the survey conducted under the SfCPoA, our team reviewed several unorthodox methods to win the confidence of the dwellers. The idea of setting up a health camp demonstrated success in securing the willingness of respondents for this survey. The precincts of Sri Maduraiveeran Kovil (a local temple) within the settlement was selected as the venue for the health camp. Similar health camps were conducted at the other sites of study, i.e., the Kamarajapuram and Muthanakulam settlements. This was done with the assistance of the medical team at Karpagam Medical College, Coimbatore.

Another prime concern that entailed the setting up of the camp was the sensitivities that would hinder the willingness of the respondents: For example, a knowledge of individual conducts and behaviours such as alcoholism, abuse, etc. are tricky aspects not only to question, but also to expect sincere responses to. Thus, the health camp consisting of a team of expert doctors and nurses was a straightforward tool to acquire vital responses. Respondents were comfortable sharing sensitive information for the cause of their own healthcare. This brings us to the aspect of trust, which is crucial to any research. The castles in the air painted by the government and the failure of their execution have shrunk the trust levels among the dwellers for their respective administrative heads. Probably, the dwellers’ strong opposition to the survey conducted under the SfCPoA had to do something with issues of trust, apart from the fear of eviction. In conclusion, the health camp we conducted aided a systematic and hindrance-free approach in realising our survey. A separate questionnaire was prepared for the health camp to record patient history and some related disquiet (**Appendix 4**).

Findings of the Health Camp

The health camp, with a total of 70 respondents, highlighted the following:

1. Age groups

Table 5.7

Recorded age groups

AGE GROUP (IN YEARS)	ENTRIES	PERCENTAGE (%)
0–14	19	27.14%
15–29	12	17.14%
30–44	22	31.43%
45–59	12	17.14%
60 and above	5	7.14%
TOTAL	70	100%

The health camp witnessed a comparatively higher percentage of participation by children and middle-aged groups. It can also be noted that the age groups 15–29 and 45–59 amounted for 17 per cent of the total participation, but that does not diminish the dominance of the other majority. Overall, a mixed percentile of age groups attended the camp, providing a holistic outcome, especially since this research is not restrictive in terms of the age factor.

2. Lifestyle and habits

The questionnaire provided at the camp elucidated a quantitative approach to analyse a patient’s (or respondent’s) history: for example, occurrence of diabetes, asthma, persistent cough, general body weakness, heart issues (congenital or genetically prevalent), and other disorders such as cancer, venereal diseases, Hepatitis B, etc. Since the health camp was the first entry point for our research, the list of diseases mentioned above were based on a literature review of the WHO health statistics. These, however, were not computed to determine morbidity/mortality rates, since the availability of precise data and subsequent generalisations at the scale of the settlement seemed ineffective. This symptomatic approach, on the one hand, guided the

doctor in analysing the case with a stronger hold; on the other hand, it aided the research in procuring genuine data. As discussed earlier, with sensitivity involved in knowing more about an individual’s habits—such as chewing tobacco, smoking beedi, drugs, and alcoholism—an attempt was made to understand this part of their lifestyle.

The data reflected the exclusion or non-entry of the age groups 0–15 and 15–30 in this category. The following table is based on the remaining sample of 39 respondents:

Table 5.8

Predominant habits

HABITS	TOBACCO	ALCOHOL	SMOKING	NO RECORD	TOTAL
Entries	14	3	1	21	39
%	35.9%	7.7%	2.6%	53.8%	100%

On the one hand, with more than 50 per cent of the sample falling under ‘no record’, this can probably be recognised as the respondents’ denial to share information and, thereby, a failure of the questionnaire’s intent in gathering genuine responses. However, on the other hand, a percentage can be attributed to those with a positive approach, thus helping the research conclude the rising awareness of the ill effects of such habits amongst the residents, most predominant in the age group of 30–45.

More than 75 per cent of the other 50 per cent of the respondents, i.e., 18 entries, reported the habit of chewing tobacco and belonged predominantly to the age group of 45–60. These entries are not restrictive in terms of gender, as that does not form a deciding factor for this research. However, general observations revealed the prevalence of tobacco chewing among both men and women, matching the age profile of 45–60 years.

To strengthen these facts, an informal interview with a resident, also a corporation worker, revealed, “It is observed that habits such as alcoholism are seen more amongst older people, and the younger generations drink less. The government offers free training programmes to CMC workers twice a year on topics such as yoga practices, use of hand gloves and masks, hand-washing techniques, safety measures, and food habits for a healthy life. This was conducted in Ooty (about 100 km. from Coimbatore) recently⁹. However, there is no space to practise yoga, even within the house...”

3. Choice of health centre – Private or government

The options for the healthcare centre included primary healthcare centres, government-established centres or hospitals, private care centres or hospitals, maternity care centres, routine medical examinations (RME), and alternate medicine. The results of the camp survey narrowed down the choice to a comparison between the private and government centres (as follows):

Table 5.9

Entries to compare the choice of service between private and government healthcare centres (data collected through the health camp)

HEALTH CENTRE	PRIVATE	GOVERNMENT	NONE (NO ENTRY)	TOTAL
Entries	40	27	3	70
Percentage	57.1%	38.6%	4.3%	100%

Given the dwellers’ pre-existing scepticism surrounding government services, the above numbers portray a stronger leaning towards private care and accessibility. The choice of a private centre over a government centre perhaps pointed out their trust in the former’s quality of services, accessibility, and affordability—more or less in the same order. Similar statistical data was computed through the independent household surveys. The results of the same are discussed below:

⁹ The training programme took place in March 2017.

Table 5.10

Entries to compare the choice of service between private and government healthcare centres (data collected through the household survey)

HEALTH CENTRE	PRIVATE	GOVERNMENT	MATERNITY CARE	NONE (NO ENTRY)	TOTAL
Entries	59	34	8	6	107
Percentage	55.1%	31.8%	7.5%	5.6%	100%

Conversely, when both results are put together for a total of 177 respondents, i.e., 107 from household surveys and 70 from the health camp, the scenario is as follows

Table 5.11

Cumulative analysis

HEALTH CENTRE	PRIVATE	GOVERNMENT	MATERNITY CARE	NONE (NO ENTRY)	TOTAL
Entries	59 + 40 = 99	34 + 27 = 61	8	6 + 3 = 9	177
Percentage	55.9%	34.5%	4.5%	5.1%	100%

With both the results summed up, the choice of services is more inclined towards obtaining private healthcare services. The notion on quality and accessibility discussed above seems justified as people seem to trust private services more. Aspects of affordability remain ambiguous in this concern, since their low income levels and economic instability portray affordability concerns even for basic services. However, the perception of private care as being cost-effective can probably be attributed to their choice.

The doctor of the medical camp was interviewed to frame as well as present a realistic picture of the issues faced by the dweller and their causes. He said, “There is poor socio-economic status in this region. So, mainly, water-borne diseases spread here. Mostly infectious ones...and many people complain of abdominal pain. They also say they can see worms and other insects in their faeces. This locality mostly

comprises corporation workers who do hard manual work and therefore complained of myalgia. Water-borne diseases occur as the drainage is connected to the nearby lakes. People consume this water which can cause infectious diseases. Tuberculosis (TB) is an air-borne disease caused by an overcrowding of people. They can have allergic rhinitis, which can occur due to faecal matter contamination. Diseases can even go up to the level of bronchial asthma. Water-borne diseases such as cholera and malaria are prevalent due to the open drainage, due to mosquito breeding (sic). Other diseases such as dengue, chikungunya, etc. can also occur.”

The probable vulnerability due to the work environments was also elaborated upon by the doctor: “Precautionary measures are not used. They say gloves and other rubber gear cause rashes on their skin. Counselling the workers to use these is fruitless, as allergies caused by wearing the rubber materials are the reason why they aren’t using them any more. They are aware of this, but are careless about it. They should wash their hands and legs for at least 15 minutes with soap and running water.”

In conclusion, the doctor revealed probable bridges for the gap: “Environmental measures need to be undertaken by the government at the community level. Drainages with proper connections must be built as people feel helpless when it comes to such things. The people can only go to a doctor to get a cure for their illness, but they cannot do anything to prevent its occurrence. At a community level, the doctors might be able to suspect the presence of diseases. There is no cancer; alcoholism is not an issue as female population is more. No maternity problems have been reported. There are issues related to toilets as they are not flushed and cleaned properly.”

Figure 5.24

Health camp



5.4 Focused group discussion

On the final day of the survey, a small-scale focused group discussion was conducted in the same temple’s premises. The idea involved a participatory rural appraisal (PRA) approach to include the opinions and knowledge of the local people in the planning, management, and the development of the project. This entailed a prioritisation exercise, encouraging the voluntary participation of the dwellers, with an objective to rate the issues based on the following scale:

- a. Alarming issue
- b. Moderate issue
- c. Least of the issues

A simple chart was prepared with a tabulation of identified issues along the X axis and the opinions of the respondents along the Y axis. The issues were identified during the course of the household survey by the team (research and survey) and enlisted. Red dots of varied sizes were provided to illustrate the scale of the issues. The biggest dot represented an issue as ‘alarming’, a medium-sized one meant it was ‘moderate’, and the smallest one suggested it to be the ‘least of the issues’ (Appendix 5).

Findings of the Focused Group Discussion

The results of the household survey and medical camp were gauged to coin the most evident shortcomings in the settlement and limit these to the

framework of this study. The identified issues were listed and prioritised by the dwellers. The methodology has been discussed earlier; the results were as below:

Table 5.12

Findings of the focused group discussion

ISSUES	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	TOTAL
Drainage	●	●	●	●	●	●	●	●	●	●	●	●	●	13 x ●
Drinking Water Facility	●	●	●	●	●	●	●	●	●	●	●	●	●	13 x ●
Job Opportunity	●	●	●	●	●	●	●	●	●	●	●	●	●	8 x ●, 2 x ●, 3 x ●
Toilet Facility	●	●	●	●	●	●	●	●	●	●	●	●	●	9 x ●, 4 x ●
Rodents	●	●	●	●	●	●	●	●	●	●	●	●	●	12 x ●, 1 x ●
Housing	●	●	●	●	●	●	●	●	●	●	●	●	●	11 x ●, 2 x ●
Health	●	●	●	●	●	●	●	●	●	●	●	●	●	5 x ●, 2 x ●, 6 x ●
Education	●	●	●	●	●	●	●	●	●	●	●	●	●	2 x ●, 11 x ●
Savings	●	●	●	●	●	●	●	●	●	●	●	●	●	6 x ●, 5 x ●, 2 x ●
Mobility	●	●	●	●	●	●	●	●	●	●	●	●	●	3 x ●, 10 x ●

R = Respondent; ● = Alarming issue; ● = Moderate issue; ● = Least of the issues

The apparent issues validated through this exercise were drainage issues, lack of drinking water facilities, rodent menace, and housing issues (justified in the order of severity), followed by the issues related to the common toilets and the unavailability of jobs.

Drainage and sewerage issues have earlier been presented in detail (open source and about being let into the lake). The issue of safe drinking water is related to the frequency of its supply. The settlement receives drinking water once a month or, sometimes, even once in 40 days. This displeases the dwellers as they are forced to travel (mostly on foot or by a two-wheeler) to surrounding areas to draw water from the municipal drinking water lines and lug it to their homes. This has been expressed as a tedious affair. The stress arising from such issues gets intensified due to other problems such as annoying rodents within their congested living spaces. Further, with meagre jobs being available, the aspect of saving seems like a challenge for CMC workers having monthly incomes ranging between Rs.5,000 and Rs. 7,000, along with the burdens of loans and debts continuing to weigh heavily on their shoulders. Ironically, healthcare has been indicated

here as a comparatively minor issue; however, the vulnerability to health risks through other contributing factors (physical and social environments) have been clearly outlined. This exercise, which was prepared on-site, has been attached as **Appendix 5**.

With the validation of issues through this exercise, it is also crucial to highlight the optimistic front:

On a general scale, it was observed that education and access to educational institutions have been expressed with great content. Although the increased school drop-out rates have been pointed out, an awareness on the need for education was observed amongst the younger generations; as a result, many children have started going to good-quality schools. Also, affordability does not seem to be an issue specific to this factor: this may be attributed to the parents' awareness of and hope for their child's good education. Mobility concerns are among the least of their problems. This can be ascribed to the settlement's proximity to one of the main bus terminals, i.e., the Ukkadam bus terminus that is located adjacent to the National Highway (NH 209). ♦

Figure 5.25

Focused group discussion – Participatory rural appraisal (PRA) technique



Source: KAHE

PART 6 CONCLUSION

This report addressed the concerns in the CMC settlement of Ukkadam with evident characteristics that narrowed the intent of this study to health and its concerns. The methodical and theoretical review of the aspects of well-being and its relation to health, along with the pre-studies that dealt with the determinants of health (both physical and mental), governance issues, and crowding as a chief influencer of the quality of life, suitably guided the survey questionnaire. The case study demanded validation by triangulating the data collated through varied methodologies. This was achieved through a free medical camp as an entry point and a trust-building exercise, independent household surveys, and a focused group discussion to stress on the alarming issues and validate the survey's findings.

A quick review of the existing health schemes, both at the national and the state levels, was touched upon to check for implementation strategies at the site. Keeping this broad framework in mind, the following conclusions can be underlined:

1. The physical environment and the immediate surroundings have been deduced to be the chief source of vulnerability for the dwellers. The reasons are multifold, ranging from open drains, dangers from open dump yards, and pollution of different kinds, to crowding.
 - The housing typologies revealed overcrowding, sheltering an average household size of 3–5 persons per habitable room (with standards specifying one person per habitable room). Furthermore, the dilapidated condition of the housing complex and its unkempt interiors added to the squalor. The encroachments are still growing exponentially with poor infrastructure to support it. The

spread of communicable diseases in such a scenario raises an alarm to prevent epidemic attacks.

- Ease of access to safe drinking water gets affected by the low frequency of its supply. This, on the one hand, forces the dwellers to boil and use municipality water, which, in turn, increases the cost of fuel (and their expenses); on the other hand, it is quite strenuous for the users to fetch water from neighbouring areas. The locations of the collection points are right beside the open drains in many cases, thus increasing health risks.
- Toilet facilities are common (one located within and one outside the settlement's boundary). The frequency of maintenance is once per day, which is insufficient for a population of 1,000 households.

Waste disposal systems are inefficient and the city (until recently) lacked segregation practices. This is still absent in Ukkadam and the presence of markets along its periphery demands higher frequencies in waste collection and disposal.

- The doctor's advice in the medical camp also revealed that excessive digestive issues were seen mostly among children—again attributed to the environment, and the predominance of joint pain and muscle pain among adults—attributed to their work environments.
- An awareness of clean practices is highly lacking in this neighbourhood. As discussed in the beginning of the report, squalor is also a behavioural facet. It is vital to conduct an awareness of environmental cleanliness. At the same time, awareness of the use of work finds importance for the dwellers who are predominantly municipal workers involved in sweeping, waste collection, drain cleaning, etc.

2. With an introduction to the sociocultural context of the dwellers (Arunthathiyar caste) and a knowledge of their practices, an in-depth analysis of an individual's lifestyle and life practices during the household surveys validated the presence of predominant health issues as a consequential response to their relative environment (both home and work), apart from prevalent habits (health behaviours) such as alcoholism, chewing tobacco, etc.

- Education, job profile, and income were analysed to reveal instabilities which contribute as stressors that alter the well-being of the dwellers. With meagre salaries, savings within households have been pointed out to be one of the major concerns. Some evidence of insurance schemes being availed was recorded. However, the income levels and prevailing loans are distressing to many, to even attempt opting for such schemes. Instead, local loans under self-help groups are availed. Trust is a matter of concern for many when it comes to seeking the government's help in this regard. Social discrimination and poverty-related issues further seem to add to their woes. All these are tacit contributors to mental agony.
- Discrimination is still apparent within the settlement. The accessibility to employment opportunities remain restricted due to caste differences, revealing their incessant gamble for social mobility.

3. A check on governance issues revealed the lack of information/awareness on the schemes proposed. Also, information on the devolution of state/central schemes at the municipality levels seems rather lacking.

- Access to medical services was recorded as, firstly, the choice between government-offered services and private services. The choice of private services over government initiatives portrays the affordability and trust in the quality of aid that the former provide. Physical accessibility was not a concern in this settlement because it is located in the central zone of the city, which is also one of the oldest parts of the city.

To restate, considering the chief determinants of health, i.e., the social and economic environment, the physical environment, and a person's individual characteristics and behaviours, along with the issues of governance, the above-mentioned pointers justify the scale of vulnerability of the Ukkadam CMC Colony settlement¹⁰. Validations of the mixed methodologies further provide an evidential report on the poor quality of life that affects the well-being of the dwellers. ♦

¹⁰ Comparison to other settlements: With similar health camps set up at Muthanakulam and Kamarajapuram settlements, the output can be somewhat measured along similar lines. The Muthanakulam settlement, however, displayed greater scales of vulnerability primarily due to its location along the lake bed and poor-quality infrastructure. On parallel grounds, Kamarajapuram locates itself in the central zone as one of the oldest settlements along with Ukkadam. The scales of vulnerability are highly comparable between Ukkadam and Kamarajapuram because the quality of infrastructure, housing typologies, people's lifestyle, and the employment type are analogous to the other.

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