INCREMENTAL CITIES
DISCOVERING THE SWEET SPOT FOR MAKING TOWN-WITHIN-A-CITY

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LIST OF TERMS ABBREVIATIONS

Aga Khan Trust (AKT)

Architecture of Rapid Change and Scarce Resources (ARCSR)

Centre for Alternative Technology (CAT)

Centre for Urban and Regional Excellence (CURE)

Chapatti : an unleavened flatbread and is a common staple in South Asian countries

Chajjas : balcony

Cluster Septic Tank (CST)

Decentralised Wastewater Treatment System (DEWAT)

Delhi Development Authority (DDA)

Delhi Jal Board (DJB)

Delhi Urban Shelter Improvement Board (DUSIB)

Economically Weaker Section (of Society) (EWS)

Gali : street or little lane

Indian Rupee (INR)

Jal : water in Hindi, with a connotation of pure (clean) water as opposed to *pani* which is just water

Jawaharlal Nehru National Urban Renewal Mission (JnNURM)

Jhuggi Jompri (slum) also referred to as JJ

Kuccha : houses made with temporary building materials such as bamboo and tarpaulin

Mahila Housing Trust (MHT)

Mandir : prayer spaces or enclosures

Municipal Corporation of Delhi (MCD)

Nalla : natural watercourse or canal that functions as an open drain

Non-Governmental Organization (NGO)

Public-private partnerships (PPP)

Pucca: houses made of reinforced concrete and load-bearing brick walls and roofs

Puja (or *Pooja*) ceremony, a hindu religious ritual

Rajiv Awas Yojana (RAY)

Resident Welfare Associations (RWAs)

Sir Dorabji Tata Trust (SDTT)

Semi-*pucca* : houses with brick walls but corrugated tin roofs (i.e. cannot take loads)

Town Planning Organization (TPO)

Urban Basic Services Scheme (UBSS)

ABSTRACT

This thesis studies how utterly marginalised people acquire acceptance or credibility - therefore participation - in the established civic and economic processes of a larger host municipality. In particular the significance to this aspiration of incremental house and city-making is explored. The primary vehicle of interpretation is Savda Ghvera, a large resettlement colony for people resettled from central Delhi, for which the author organised a central sewerage system, which in turn became the basis for a neighbourhood association with political influence. Incrementalism describes a process of city-making in increments - as materials, time, etc. become available - mostly through the [self-] building of houses which, in their later stages, can support commercial or other activities. The main concern of this thesis is two-fold. Firstly it studies "shared incrementalism", or the degree to which a commitment arises to a social and political context greater than an aggregate of individual houses. Secondly, it studies the role of making in creating the conditions for sharing, and with that, the roles of a visiting architect-researcher. On one hand, the constraints upon marginalised peoples are severe, and it is impossible to accurately assess the depth of commitment to both house and to a larger social and political order. On the other hand, it is evident that the opportunities for collaboration are volatile, constantly shifting, and that the virtues of solidarity are not necessarily accepted at face value. The process of shared incrementalism is seen through the lens of Amartya Sen's concept of 'freedom' in the context of global capitalism, which places stress on what he terms 'capacity-building'. The term emphasises the capacity of an individual to escape poverty and acquire dignity, whereas this thesis studies not only how this might be achieved through shared incrementalism but also the conditions under which this sharing might be converted into long-term political solidarity. Accordingly, comparison is made between Savda Ghevra and older resettlement colonies that have been absorbed by ever-expanding Delhi.

Keywords: Incrementalism, Sharing, Resettlement colonies, Delhi.

1. INTRODUCTION

1.1 THE TOPIC

This research explores the phenomenon of urban growth through the lens of resettlement colonies in Delhi, India. Resettlement colonies are settlements initiated by the Delhi municipal authorities as a response to inner city slums. The Indian capital city of Delhi, with an approximate population of 22 million, has long attracted migrants seeking employment, healthcare, education etc. Most of Delhi's urban poor live in over-crowded and insanitary settlements, commonly known as slums[1] or squatter settlements (locally JJ for *jhuggi jhompri*), and usually do not have access to safe and secure shelter and basic infrastructure and services. They live in illegal and informal settlements because they cannot afford formal shelter, and are consequently excluded from the formal housing market. During the 1960s and 70s, planned government interventions resulted in massive slum clearance projects and the development of 44 resettlement colonies on the periphery of the city. Between 1990 and today another 33 colonies on the peri-urban fringe have been developed in parallel to the demolition of approximately 95,000 houses, half of those between 2004 and 2007 (Bhan, 2008, p.16). These resettlement colonies develop in a piece-meal fashion with little or no state services to support their growth. The economic rationale for the demolition of slums and their relocation to peripheral sites is that the value of inner city land is prohibitively expensive (Batra 2010, Baviskar 2010, Ghertner 2011(a), Dupont 2001,2008).

The primary research work was carried out in Savda Ghevra, a resettlement colony established in 2006, secondary research in Bawana also established in 2006 and Dakshinpuri and Kalyanpuri, older colonies, established in the 1960s.

1.2 PROBLEM: MAXIMISED CITY

Delhi's rapid urbanisation between (but also before) 1950 and today, like many cities of the global south, is characterised by physical growth paralleled by, and accommodating, an exponential population increase. This growth is predominantly driven by rural to urban migration motivated by an aspiration to gain access to the benefits of the city: education, healthcare, jobs and housing. However these migrants find it hard to make a claim, participate in, or fabricate new formal and informal institutions which would deliver the capacities required to obtain these freedoms for themselves and their families. A large portion of these migrants begin city life in makeshift homes in unplanned slum clusters or by integrating into congested inner city areas officially classified as "notified slums".

At the 2011 Census, India had 53 metropolises (cities or urban agglomerations) of more than a million inhabitants (up from 35 in 2001), among them eight mega cities with more than five million inhabitants (Government of India, 2011) . Globally, India has the second largest urban population despite being still predominantly rural with 31% urbanites in the total population according to 2011 census figures (Chandramouli, et al., 2011, p. 5). According to the 2008 Economic Survey of Delhi (Government of NCT of Delhi, 2009), Delhi, by population, is composed of 14.8% JJ Clusters, 19.1% Slum Designated, 5.3% unauthorised, 12.7% resettlement, 5.3% rural villages, 12.7% regularized-unauthorized, 6.4% urban villages and 23.7% planned colonies. Only a quarter of Delhi residents live in formally planned settlements - all the rest are bound together as urban forms that have evolved outside the Master Planning process, although often influenced by regulation and implementation policies. A recent, unpublished,

study by the Centre for Urban and Regional Excellence (CURE) concluded that 0.5% of the total area of Delhi is occupied by the 14.8% of residents living in jhuggi JJ Clusters (as per the Economic Survey, ibid) revealing very asymmetrical experiences of city living. As such, Delhi, India's capital city provides a suitable backdrop to examine the issue of how governments address their urban slum populations particularly through resettlement initiatives.

1.3 RESEARCH QUESTION

Both inner city slums and many of the resettlement colonies studied here are characterised by incremental development – a process that is not planned but rather built over time by individuals, families, and social networks (Hosagrahar, 2001, p.34) - in contrast to other new mainstream neighbourhoods which are usually master planned, removing or reducing the opportunity for residents to take part in the making of their own dwellings, streets and neighbourhoods. This research examines the role of sharing in the incremental process of city-making in certain resettlement colonies – that is, in the fabrication of institutions which enable city residents to acquire the capabilities which can give them access to the freedoms (Sen, 1999, 2013) offered by the city of Delhi, taking the resettlement colony of Savda Ghevra as a case study. Alternative low income initiatives by the Delhi government include the one-off construction of multi storey apartment blocks, a process which avoids incremental development and therefore excludes the resulting opportunities for sharing. The thesis is not looking at a comparison between these two government approaches but rather focusing on the merits and demerits of shared incremental development in a particular site and (some) service provision in slum resettlement colonies.

1.4 THE SCHOLARLY CONTEXT

Although there is extensive literature in the field of urban planning and development in Delhi and India, the literature about resettlement colonies and their making is limited and on the whole does not address the processes by which resettlement colonies have physically come about either historically or today. There is much literature that argues for more inclusive development to curb the capitalist neoliberal policies which are producing cities based on a culture of segregation, and which question the right of the poor to participate equally in city life (Baviskar 2010, Ghertner 2010). This literature is set against arguments by Amartya Sen in *Development as Freedom* (1999) which presents capitalism as the best vehicle for self empowerment. Both of these premises – those that are against and for capitalism - are a call to be more precise, and in the context of architectural research, highlight the need to study how city-making happens, the shared networks involved and specifically, in the context of Delhi resettlement colonies, the processes of incremental change, and the subsequent opportunities for development.

The research reviews several live projects in Savda Ghevra, in most of which the author has been involved at a variety of levels. These projects have focused on the encouragement of sharing (participation, institutions, common ground, and cooperation) in the process of incremental change with a view to facilitating the wider project of equitable city building. These projects seek at both a theoretical and practical level to contribute towards initiating, refining and enhancing methods of sharing in incremental development as a way of increasing the residents' ability to acquire the capabilities necessary to give them access to the freedoms offered by the city.

The research builds on ethnographic studies which review lived experience and perception (Tarlo, 2003; Gandy, 2011; in India and Hall, 2012; Barac, 2011; globally) in marginalised and slum (informal) areas. However, such work is dominated by sociologists, ethnographers and anthropologists and little work has been carried out in developing an understanding of the resistances encountered and accommodations made, a process which is inherent in city making when initiated by the residents themselves. The objective of the research is to contribute to urban studies a more concrete description / interpretation of what 'city' and 'urban order' is found in a place like Savda Ghevra which is relevant to the burgeoning research on urban informality and 'subaltern urbanism' (Roy, 2011).

At a theoretical and practical level the research contributes towards and develops on three scholarly themes (1) 'Development as Freedom', (2) Sharing as material institutions and (3) Incrementalism as an opportunity for intervention.

1.4.1 DEVELOPMENT AS FREEDOM

The primary theoretical concern of the research is the relationship between shared incrementalism and accessing the benefits of the city. In this thesis these benefits are understood as 'freedoms' (Sen, 1999) and include what are often described as 'rights' (Marcuse, 2012; Brenner, 2012) : the right to clean water, clean air, adequate housing, sanitation, mobility, education, health care, democratic participation in decision making etc. The research presents the benefits of the city through the lens of freedoms because the emphasis is on capacity (Sen, 2013) and participation (Hamdi, 1995, 1997, 2004, 2005; Turner 1976) as opposed to rights (UN-Habitat, 2008). The problem with the rights based approach is that a 'right' inherently implies that there is a custodian of that 'right'; and one 'right' might eliminate or come into conflict with another 'right' – say the right to housing with the right to green space. The UN defines the 'right to the city' within a framework of 'equality' rights whether social, political, economic or cultural (UN-Habitat, 2008, pp. 57) as a way to promote inclusive development. In democracy literature there are three distinctions: formal, participatory, and substantive rights. The problem with the rights based approach is that all Indian citizens have formal and substantive rights but, to use the phrase coined by the anthropologist Arjun Appadurai, many are "citizens without a city" (Appadurai, 2001, p.27) and what is missing is the participatory dimension. Many urban citizens are excluded from the benefit the city has to offer, so the real question concerns the actualisation of those formal and substantive rights into collective (participatory) capacities; which is why the notion of 'freedom' provides such a useful theoretical lens. Rather than predefining collective rights this thesis examines the extent to which residents as 'citizens of the city' can make a claim on the city through the building processes and institutions through which they operate. Freedom, as defined by Sen, links reaching one's full potential and positive development (Sen, 1999); a central tenet of development economics regarding effective poverty alleviation. Development economics is primarily driven by a methodological position from which to best understand poverty alleviation. Currently there is a debate under the umbrella of "new" development economics about whether there should be more theory or more practice or empiricism in this area (Banerjee, 2005).

Amartya Sen argues that development should be seen as a process of "expanding the real freedoms that people enjoy" (Sen, 1999, p. 1). Expansion of freedom is viewed, in this approach, both as the primary end and as the principal means of development. "Development consists of the removal of various types of unfreedoms that leave people with little choice and little opportunity of exercising their reasoned agency" (Sen, 1999, p.7). Sen places much emphasis on

an expansive definition of 'substantive freedom' as whatever helps human beings fully exercise their capabilities or, less formally put, the freedom to achieve various lifestyles. Sen writes:

> *Societal arrangements, involving many institutions (the state, the market, the legal system, political parties, the media, public interest groups and public discussion forums, among others) are investigated in terms of their contribution to enhancing and guaranteeing the substantive freedoms of individuals, seen as active agents of change, rather than as passive recipients of dispensed benefits. (Sen, 2011, p.84)*

The focus on 'capabilities', places the emphasis on the goal of development practice to improving people's ability "...to lead the kind of lives they value – and have reason to value. These capabilities can be enhanced by public policy, but also, on the other side, the direction of public policy can be influenced by the effective use of participatory capabilities by the public" (Sen, 1999, p.18). The two-way relationship is central to the analysis presented here. Housing is at the heart of this debate because in India one's claim to housing is the basis for access to ration cards and electricity bills which help secure the right to education, healthcare and the other benefits of the city (Chaudhuri, Dupont, Lama-Rewal, and Zerah, 2011). This is consistent with capitalist ideas of property-ownership, but also provokes the question of whether housing is sufficient, as we have seen with sterile apartment blocks, to create the possibility for participation in a civic life that depends upon the setting for exchange, conflict, collaboration, creativity etc.

The aim of the research is to contribute towards an understanding of capacity process on the ground in the coming together (sharing) around the production and maintenance of small scale infrastructural configurations beyond the top down framework Sen provides. Asking how can freedom to participate through house and infrastructure improvement contribute towards an understanding of citizenship in the city through the lens of capacity? For the slum dweller forcibly relocated to a resettlement colony the hyper-commodification of social necessities (housing, transportation, utilities, public space, healthcare, education, water supply and sewerage disposal) limits an individual's capacity to 'buy-in'. When capacity is linked to capital, and in turn incrementalism is understood through the lens of development the proposition is ultimately to climb social, cultural and economic divides. Doug Saunders (2009), in an article for the Globe and Mail, writes that middle class status "means freedom from absolute poverty, the ability to borrow money, home ownership, the ability to put your children though school (and likely some post-secondary education) and some sources of savings and equity that could be used to start a small business." Nancy Birdsall, head of the Centre for Global Development, calls this group the "catalyst class", a class which is "internally driven, self-sustaining, [capable of exerting] political and economic pressure – from the bottom up – for better governance and economic reform" (Centre for Global Development, 2011). The idea of a "catalytic class" merges the concept of upward mobility with civic and political institutions requiring enough people sharing interests to make demands. Banerjee and Duflo define the middle class as those likely to be less connected to agriculture, more likely to be engaged in small business activities, and benefit from formal sector employment or have a weekly or monthly salary which enables them to adopt a long term perspective towards their finances (Duflo, 2006). However, Banerjee and Duflo also present data showing how business investment is marginally different between the middle and poor classes; and that the middle and poor classes are just as likely to be business owners and have similar business types (ibid). "It was the economist Amartya Sen who first recognized that poverty is, fundamentally, not the dearth of money, but the absence of capacities – the lack of tools or opportunities needed to function as a full citizen" (Saunders,

2010(a), p. 280). When these commodities (or capacities) do not reach all of society (whether this is because they are out of reach financially or because of a failure to deliver the systems which ensure the distribution of such commodities) what happens then? Does incrementalism and sharing offer a way forward?

1.4.2 SHARING AS MATERIAL INSTITUTIONS

Freedom to reach one's full potential also involves a range of institutions, from the state and the legal system to public interests groups amongst others. It is these institutional arrangements that are the custodians of enhancing and often guaranteeing freedoms individually or collectively. Sharing, in principal, requires a constituency, i.e. more than one participant, and so sharing happens within some form of institutional structure. Sharing institutions and subsequent exchanges can happen within many forms: informal, formal, big, small, democratic, family, friend, ethnic, gender based etc. for many of which the 'rules' are intuitive: learned through the experience of participating and accepted cultural norms. The challenge is, how to identify and describe different types of institutions? And as institutions are made up of people, binding these individuals together as groups depends on trusted and not trusted representation. In order to define institutions we need to examine how are they formed? What kinds of rules, negotiations and practices help consolidate and facilitate these groups? How can institutions operate to suit the autonomous individual within the common whole? These kinds of institutions are so important because the aggregate of individuals is often the opposite of 'community', and the idea that there is an intermediate condition - found in a temple, hair salon, or sanitation system - needs to be acknowledged. In this context sharing is so much more than just encounter but something that requires membership, investment and that which has the ability to reconfigure difference. The word sharing is used because collective - a now well versed antidote to neoliberal individualisation is too loaded - sharing is true to an interest in primordial relationships and negotiations.

Sharing (and particularly in the context of incrementalism) refers to a process of partnering across institutions ranging from households to religious institutions and government. The production of place and the architecture – whether this is embodied within a house or even just a party wall – is in the build-up of the institutional order related to a specific location, rather than just the process that results in a building. The process of shared making challenges the relationship between service providers and the recipient by viewing it as a partnership whereby the users become active in the design, making, operation and management of the projects and not just passive beneficiaries. It is proposed that such methods of making which use embedded local institutions will deliver 'development' which is culturally appropriate, responsive to local needs and sustainable.

The research question, in examining the role of sharing in incrementalism, draws a distinction between individual and collective incrementalism. There is much literature which defines sharing within the parameters of cooperation (Sennett, 2012) where mutual support results in the participants benefiting from sharing (Ostrom, 1990) and the resolution of difference (Amin and Thrift, 2002). Eleanor Ostrom provides the most considered research on the use of collective action, trust, and cooperation in the management of common pool resources. Since Garrett Hardin coined the phrase "the tragedy of the commons" in his article, with that title, in Science magazine (1968) this has "come to symbolize the degradation of the environment to be expected whenever many individuals use a scarce resource in common" (Ostrom, location 156 of 4156). Ostrom's presents a critical perspective of the work of Mancur Olson (1965) in *The Logic*

of Collective Action which was critical of the idea that individuals with common interests would work together to achieve those interests. Specifically Olson challenged the idea that a collective benefit would be enough for cooperative structures. In response Ostrom writes...

> *Both centralization advocates and privatization advocates accept as a central tenet that institutional change must come from outside and be imposed on the individuals affected. ... Instead of presuming that optimal institutional solutions can be designed easily and imposed at low cost by external authorities, I argue that 'getting the institutions right' is a difficult and time consuming, conflict-invoking process. ... I mean institutions that enable individuals to achieve productive outcomes in situations where temptations to free-ride and shirk are ever present. (Ostrom, 1990, location 315 of 4156)*

Ostrom went on to identify management principles for common resources, some of which have informed the methods in the live projects studied here and are framed in this research by examining the extent of shared making. The research on sharing contributes to a growing body of work which seeks to understand the processes by which collective action results in enough consensus and agency whereby cooperation through sharing and between individuals translates into social capital (Sennett, 2006) and as a mechanism for the marginalised to negotiate, leverage, and participate in the state or market (Chatterjee, 2004; Benjamin, 2004). The challenge is, especially in the case of the poor, the question of how to balance individual aspiration and need within a larger coherent coalition.

1.4.3 INCREMENTALISM AS AN OPPORTUNITY FOR INTERVENTION

One of the key elements of the conception of incremental is the architecture, both in its making and in its substance as a vehicle for allowing town-within-city to emerge. The hypothesis is that 'incrementalism' encourages the contributions of people to shape and affect their environments by being active participants in the process of making 'place' through incremental improvements, additions, and developments celebrating the importance of 'tinkering' (McFarlane and Vasudevan, 2014). Arguing that opportunities are opened up which are lost in large scale, one-stop projects; setting incrementalism against master planned urbanism which is characterised by one-stop, large scale, hierarchical, inflexible, highly capitalised and centralised 'city-making' projects. This approach to city planning becomes central to development economics, the argument being that there is a direct relationship between human freedoms and capacities (Sen, 1999) and the making of the built environment. Through participation and engagement with the city/town/neighbourhood, those human freedoms can be achieved – and people can be agents of their environments rather than passive beneficiaries or victims.

> *Participation also has intrinsic value for the quality of life. Indeed being able to do something not only for oneself but also for other members of the society is one of the elementary freedoms which people have reason to value. The popular appeal of many social movements in India confirms that this basic capability is highly valued even among people who lead very deprived lives in material terms. (Dreze and Sen 1995, p. 106)*

The word incrementalism (also called gradualism), was first coined by Charles Lindblom in

his article "The Science of 'Muddling Through'"(1959), and was used in policy and decision-making theory as a method of working using small (often unplanned) steps or changes. It was quickly picked up as a way of describing the built environment in the 1960s when western architects started travelling abroad and documenting unplanned (slum) settlements. Most famous was John F.C Turner (1972, 1976) who based his ideas on the observation that in emerging/developing cities, rapid growth of the urban population had occurred faster than the formal housing market resulting in an incremental – informal and piecemeal - housing stock. Furthermore this piecemeal, incremental housing stock represented a process of building which is self-built or self-initiated and gradually extended and adapted by the inhabitants themselves to suit their own requirements. Turner argued that this self-built process was more successful at meeting the demands of rapid urbanisation than the state or market.
A contemporary of Turner was John Habraken (1972) who called for a shift in how mass housing was conceived, produced, built and occupied in his book *Supports: an alternative to mass housing* in 1962 (later reprinted in 1972). Much like the idea of the Core House (Chapter 2) he proposed to divide immovable structures (those subject to regulation and required for structural stability) from everything else which could be adapted to suit the user. Another proponent of the incremental approach was Nabeel Hamdi (1995, 1997, 2004, 2005) who like Turner saw incrementalism as an urban design strategy whereby the cost of housing could be reduced by recognising that poor urban families already build and extend their own dwellings incrementally in response to their needs and the availability of resources (Wakely and Riley, 2010). Housing is therefore perceived as a process (Turner, 1972): While the noun 'house' is about a domestic environment, the term 'housing' emphases the enabling aspect of the house – a call for understanding the freedom afforded through housing. A definition of housing not just as the primary theatre for the 'everyday' but that which binds larger social, economical, and cultural aspects together and not just as a final product. Viewing the process of housing in this way raises the particular question of what is role the state should play in this process.

Incrementalism as a state-sponsored design strategy got its first major test in 1965 when Peru's architect-president Fernando Belaunde Terry initiated an experimental social housing project to the backdrop of mass informal urbanisation in barriadas (slums) in Lima. The project, PREVI, brought together 13 internationally known architects and 13 Peruvian architects to propose designs for low-rise, high density social housing units that could grow incrementally, in other words accommodate future transformation as an antidote to large blocks. Although the project never lived up to its hype, in 1974 500 units were completed and are today examples of successful incremental change. As writer Justin McGuirk says, "PREVI marked the shift from a dogmatic modernist approach to housing the poor to one that capitalises on the evolutionary, organic nature of informal settlements" (Icon, 2009). Garcia-Huidobro et al., describing PREVI, writes:

> *In the context of countries with few economic resources, the efforts of each occupant can be taken advantage of to bring about what the State could only implement if it were to set other social aspects to one side. So, understanding housing as a platform of transformation enables the problem to be addressed from the viewpoint of an incremental process in which the intervention of the occupant may enhance the property, the city itself and, in the last analysis, the state's investments. ... All the same it's not enough just to introduce new notions by considering single-family housing in a piecemeal way; self-managed transformation on a house-by-house basis in turn generates an urban complexity providing richness and consolidating the urban fabric. The city understood as a collage consisting not only of different*

> *large-scale interventions but also of a huge number of transformations at the scale of the individual house, strengthens social networks and favours the urban integration of local neighbourhoods; so, the collage-city is a living city, a complex city. (Garcia-Huidobro et al. 2008, pp.32-33)*

PREVI was, until recently, the most well-known architect-led intervention in incremental housing although through the 1970s and 1980s this approach to social housing – where the cost of housing is reduced by recognising that poor urban families build and extend their own dwellings (the de facto pattern in urban growth) – was used in site and service schemes throughout the developing world (Wakely and Riley, 2010). A descendant of PREVI is Chilean architectural practice Elemental's (fronted by Alejandro Aravena) housing in Iquique. Aravena's incremental approach is best described by Justin McQuirk when interviewing Aravena he writes, "a standard answer might have been to build high-rises, but that wouldn't have allowed the families to expand. Aravena decided that since they only had enough money to build half a house for each family, that was exactly what they would do. When you have money for half a house, the question is which half do we do?" (Icon, 2009).

Charles Correa, one of the architects who designed and built a scheme for PREVI, was a proponent of the incremental approach as a strategy to deal with India's housing crisis (Correa, 1989; Mehrotra, 2012). Following PREVI Correa went on to use the incremental approach for a neighbourhood in Belapur, a low cost housing project in Navi Mumbai. Belapur was designed as small clusters of low-rise high density courtyard houses built such that each family could extend and adapt their own house independently. Today the original houses in Belapur are barely visible yet the courtyard remains intact (Wainwright, 2013). In his book *The New Landscape, Urbanization in the Third World* Correa puts forward a manifesto for incrementalism...

> *It is incremental. That is it can grow with the owner's requirements and his earning capacity. ...It has great variety, since the individual owner can design and build according to his own needs. ... This pattern is sensitive to the social/cultural/religious determinants of our environment – factors which are of increasing concern in developing countries. It is relatively easy for the people to adjust the spaces to suit their own preferred lifestyles. ... Furthermore this initiative engenders an increase in per capita savings, so that housing is built without sacrificing other national investment targets. ... Individual houses can be made out of just about anything, starting with bamboo and mud bricks, then improved over time. (Correa, 1989, pp.49-51)*

Just like PREVI was an attempt to formalise and improve on what was already happening, Correa too was trying to design a type of subaltern (Roy, 2011) urbanism – more than just a slum ontology, this is the production of urban spaces outside the logic of formal planning paradigms (Roy, 2011). Jyoti Hosgahar (2001), describes the autonomous incremental nature of the historic core of Delhi as an 'indigenous modernity'. Delhi - site of seven cities[2] - established by different rulers, most of which are no more than ruins surrounded by urban villages, offers a characterisation of the image of Delhi as fragmented, a city of cities. The subdivision and reinvention of the historic core of Delhi, Shahjahanabad (the 8th and last 'city of cities'), which continued well into the post-colonial period is described by Jyoti Hosagrahar as paradigmatically 'incremental'- she writes:

> *The organic layout and incrementally developed structures of the walled city were neither accidental nor disorderly. Rather, the built form was a reasonable response*

> *to existing social and functional needs, to climate, and to available resources, materials and technology. People built and used space in ways that responded to indigenous notions of identity, social functions and behaviour, and spatial assumptions. ... Many inhabitants of the city saw their various traditions, such as inherited building practices, not as superstition but rather as embodying cumulative knowledge. (Hosagrahar 2001, pp.32)*

Incremental housing is characterised as a process that is not planned – a process by which houses are built over time by individuals, families and social networks. The 'incremental developed structures' Hosagrahar identifies that compose the historic core of the city provide a template for unplanned structures that are the result of "social and functional needs, sensitive to climate, and to available resources, materials and technology" (Hosagrahar 2001, pp.34). These, then, are "the spatial and architectural forms of 'hybridized and colonial' and 'postcolonial modernities', providing the material infrastructure in which forms of everyday life, social relations, as well as individual and group representation take place" (King D. A., 2004, p.149).

The architect and urban historian Rahul Mehrotra (2012) describes India's urbanism as one where two worlds collide: the "kinetic city," temporary and in motion, and the static city," monumental and aspiring to permanence. He writes...

> *Today, Indian cities are comprised of two components occupying the same physical space. The first is the Static City. Built of more permanent material such as concrete, steel and brick, it is comprehended as a two-dimensional entity on conventional city maps and is monumental in its presence. The second is the Kinetic City. Incomprehensible as a two-dimensional entity, it is perceived as a city in motion – a three-dimensional construct of incremental development. The Kinetic City is temporary in nature and often built with recycled materials: plastic sheets, scrap metal, canvas and waste wood. It constantly modifies and reinvents itself. ... It is an indigenous urbanism that has its particular 'local' logic. It is not necessarily the city of the poor, as most images might suggest; rather it is temporal articulation and occupation of space, which not only creates a richer sensibility of spatial occupation, but also suggests how spatial limits are expanded to include formally unimagined uses in dense urban conditions. ... Here the idea of a city is an elastic urban condition, not a grand vision, but a 'grand adjustment'. (Mehrotra, 2012, p. 1-2)*

The kinetic city is an alternative to slum and informal which is a reading of the city, but also a response and reaction to the city. Mehrotra is keen to create a more effective taxonomy of city readings and to not read cities in one image.

A central tenet of mainstream development economics has been the positive causal relationship between home ownership and positive, often incremental, housing investment. An investment into a house adds a specific value to one's assets allowing for comparison and leverage of wealth (De Soto, 2001) as credit collateral, while promoting a better, healthier and richer living environment. Hernando De Soto (2001) claimed that the main objective of tenure policies is to provide sufficient security of tenure to stimulate land development and house construction. De Soto argued that to solve the housing crisis embodied in the burgeoning slums was to simply provide tenure which would be a sufficient incentive to trigger incrementalism in the form of housing investment by the residents themselves. However a counter-argument

is that security of tenure in low-income housing settlements depends less on legal status and more on matters of perception by residents regarding the probability of eviction, the availability of services, and the passage of time. De Souza (2001) found in a study of informal housing in Brazil that there was relatively little relationship between security of tenure and housing improvements. De Souza found that saving capacity, access to work, stable incomes and construction skills were as important to long-term consolidation as secure tenure. De Souza also presents an alternative position whereby more "consolidated" constructions in the absence of title deeds increases personal security as the whole settlement consolidates; and this translates into tenure security through a de facto presence. Thus De Souza identifies supportive networks within the community as a key factor in developing an environment suitable for house upgrading.

The following chapters will explore how those marginalized or so disposed can participate or claim an active role in shaping the city. The hypothesis is that incrementalism, once operationalized can result in the capacity to make a cultural or political claim. McFarlane and Vasudevan (2014) make the distinction between incrementalism and insurgency, highlighting the difference in how a claim is made and what transformative effect it has. Insurgency they argue, is to change the terms of definition, to alter the normalised meanings of resources such as 'house'. In the spirit of Turner, incrementalism can accommodate spatial and social experimentation when resources are scarce. Insurgency, however, fundamentally challenges the structural conditions that constitute the urban. It was precisely this difference that animated the debate and literature back in the 1970s particularly between Turner and the Marxist geographer Jon Burges. Burges' criticism of Turner's idea of incrementalism was that in reframing the housing problem and offering self-help as the solution Burges saw this as depolitizing the class question. As such it is important to distinguish, and so advance the debate on incrementalism, that in the context of architectural making, incrementalism here isn't about drivers of change but as opportunities for intervention. The hypothesis is that the architectural project as a process allows for, particularly in marginalized neighbourhoods, for others to actively participate.

Incrementalism is an idea that mediates between urban theory, the spatial organisation of the city, and the experiential position of living in a city including economic and political agency. Moving away from the physical form, architecture is seen as an agent through which social and economic structures emerge. The challenge for architects lies in the Catch-22 presented: on celebrating the natural, emergent order of things – that which has taken place outside the formal guidance of (master) planning – what role can an architect take without removing him/herself completely, or impeding the very thing being celebrated? In asking how are settlements, neighbourhood and cities made, and how to add to them 'incrementalism' amplifies the importance of architectural making – a collaborative shared process.

1.5 GEOGRAPHICAL AND HISTORICAL REVIEW OF RESETTLEMENT COLONIES IN DELHI

Some of the most important conditions for the rise of resettlement colonies were created by Partition (1947) post-independence. By 1951 the population of Delhi had almost doubled from 0.91 million in 1941 to 1.764 million (Puri, V.K. P. xivi). The effect of this was to push land speculation, raise rentals and put pressure on civic services – all factors which greatly influenced the development of slums. The First Five Year Plan (1951-56) had already declared slums to be a national problem and by the Second Year Plan (1956 – 61) these slums became

common to most large towns and cities. In order to accommodate increasing numbers the post-independence government built a number of 'colonies' which successfully housed an urban, educated and predominantly middle class but did little for the poor rural migrants that formed the economically weaker sections (EWSs) of society. Between 1962 and 1977 in Delhi the resettlement colony in its current form took shape as a government response to the growth of the walled city and burgeoning slum (squatter) settlements. A review by the Town and Planning Organisation (TPO) (Priya, 1993, p.230) concluded that the neglect of adequate provisions for low cost housing resulted in a rapid increase in JJs. Following this review a change from slum clearance to site and service resettlement colonies was adopted under the control of the Municipal Corporation of Delhi (MCD) to deal with the burgeoning 'slum problem'. The site and service concept at the time was emerging globally as a solution to informal and illegal settlements, a concept supported by organisations such as the World Bank and the United Nations.

Resettlement sought and failed to resolve the conflict between the non-existent 'planned-city' and the 'actual city'. The conceptual idea of the planned city - alive only in publications and books - was divorced from the reality on the ground: slums were, rather than drawn, identified by large patches of green space on planning maps, indicated as ready for development once cleared (Baviskar, 2010). The 'actual city' followed the masterplan more in violation than in compliance: by the mid-1970s there were 550 'unauthorised colonies' the by-product of a quasi-legal and illegal sale of land earmarked for low income groups promoted and enabled by the Delhi Development Authority (DDA) monopoly over 'urbanisable' land acquired and developed by the DDA (Batra, 2010 p.24). The result has been a long lasting legacy of haphazard or non-existent planning mainly in fringe areas where "in such anomalous situations, politicians have a golden opportunity to distribute favours of water, electricity etc., regularising settlements etc." (Bhide, 2011 p. 14)

Between 1962 and 1975, 17 resettlement colonies were created but it was between 1975 and 1977, the Emergency Period[3], that the resettlement colony as part of urban Delhi really took shape. During this period, which saw the most aggressive of schemes on the back of slum clearance and family planning (sterilization), about 120,000 households (approximately 700,000 people) were resettled to 27 resettlement colonies on the periphery of the city (or urbanised zones) (Priya, 1993, p.827-8). The result of placing these resettlement colonies for low income groups on cheaper low-lying wasteland, often along drains and ditches, was on the one hand a drive to fashion the socio-spatial geography of the city but on the other hand to reduce the accepted Delhi Building Bye-Laws from the housing plot standard down from 40 to 25 sq m[4]. Most of these colonies, and all of those started during the Emergency period (1975-77), were quick evacuation and demolition schemes where the dwellers were forcibly evicted with no warning and transported out to barren sites with limited services and public amenities. With little to no community consultation 'development' was left in the hands of the residents themselves. Thus a policy developed in response to the informal incremental city resulted in plans for new incremental (resettlement) colonies. As described by Ritu Priya in an article for Economic and Political Weekly (1993, p.828), "much of the effort for improving housing, etc, is taken by them [resettlement colony dwellers] on their own initiative".

By the 1980s the dominant town planning practice in the form of the Urban Basic Services scheme (UBSS) came to accept 'slum improvement' or 'slum upgrading' over 'clearance' as the most realistic way of dealing with illegal and insanitary settlements. This was also in part because of the collective negative memory[5] of the Emergency Period, which did not favour

resettlement. Batra (2011, pp. 26) writes...

> *The democratic outrage against the Emergency and the resounding defeat of the Indira Gandhi government in 1979 ensured that slum demolition on a large scale became politically unfeasible for almost two decades. Anxious to erase the memory of the Turkman Gate incident, where twelve people protesting against the demolition of their homes were killed in police firing in 1976, and reclaim a pro-poor image for the government, the Sixth Five Year Plan (1980-85) categorically proposed giving up 'the strategy of attempting massive relocation of slums in urban areas', and instead envisaged increased investment in the environmental improvement of slums, particular in the provision of low-cost sanitation and drainage. Thus by the later 1990s, the city had more than 1000 slum clusters with over three million people living in them.*

Following the 1985 Sixth Five Year Plan slum clearance and resettlement were discontinued. Nevertheless improvement schemes did little to address housing for the EWS of the population a situation which was compounded by the fact that the DDA retained the right to demolish and clear land (mostly housing EWSs) whenever it could be put to better use (new roads, middle income housing, sporting facilities, beautification projects). No major new resettlement was initiated until 1990 when a new resettlement policy was drafted, resuming resettlement colony provision.

From 1990 onwards the Slum and JJ Department – the body responsibly for government slum policy - adopted a three-pronged strategy for dealing with the problems of JJs (which brought resettlement back to the table): (1) relocation (to resettlement colonies and/or tenement blocks) of squatters, (2) in-situ up-grading and (3) environmental improvement of urban slums (including previous resettlement colonies). The relocation or upgrading of slum settlements is no small ambition in a context where "one-third of the citizens of Delhi live in settlements that meet the minimum legal and planning standards. Recalling the social composition of Delhi according to the Economic Survey (Government of NCT of Delhi, 2009) only 23.7% of the city lives in planned colonies. Most of the city is, in fact, on the border of informality and legality" (Bhan, 2008, p. 3). Solomon Benjamin writing about these unplanned urban structures, particularly resettlement and unauthorised areas of Delhi says, "What binds these various forms is that they evolved outside the Master Planning process, although deeply influenced by its regulation and implementation politics that shapes, among other things, the diverse and de-facto tenure forms" (Benjamin, 2004, p.67). Chaturvedi (2010) writing about resettlement policy in terms of formal housing provision points out that ...

> *... nearly half of Delhi lives in substandard housing. They should have found planned housing way back in the 1980s, but the master plan was ignored by the DDA and the land parcelled off to someone else. Later, several slums were demolished as wealthier neighbourhoods went to court for their removal. The relocation has been limited [to those eligible] and traumatic – on the borders of Delhi, far away from work, unconnected to infrastructure and other facilities, and devoid of a familiar sense of community. It results in several men becoming homeless for the week, returning to their families only on weekends. (Chaturvedi, 2010, p. xi)*

The process of slum formation, upgrading and resettlement has been shaped in part by the liberalisation of the Indian economy since 1993 where the configuration of urban space in Delhi

has, for the past two decades, been driven by an aspiration by the political classes to become a global metropolis and a world-class city (Ghertner, 2007). The 'world class city' classification is described by Amita Bavistkar (2003, p. 89) as "bourgeois desires for a clean and green Delhi [which have] combined with commercial capital and the state to deny the poor their right to the environment." However, what has also happened during this most recent period is that, in India's transition from post-independence social democracy to capitalist market liberalism, the state has more or less given up a responsibility to use capital investment and state-led projects to project an idea, or vision, of India within the physical environment, as it had done in the immediate post-independence era – most famously with state-led projects such as the development of Chandigarh. Today the major state-directed projects are highways, flyovers, airports, and communication networks that connect urban centres but do not contribute to determining or guiding the physical form of these urban centres (Mehrotra, 2013). The result is a disjunction, literally, in the physical fabric of Indian cities today propelled by the hyper-commodification of urban land and other social necessities (housing, education, healthcare and even sewage disposal). However it wasn't until 2003, when India won the bid to hold the 2010 Commonwealth Games[6], that resettlement returned aggressively to the forefront of slum policy with the creation of sites like Savda Ghevra – the location for this research work. In the last decade, to make way for this 'world-class city', more than one million people[7], living in various slum clusters in the city, have been driven out to the periphery (Batra, 2010). Ghertner (2011a, pp. 23) describes this 'diaspora'...

> *Between 1998 and the present, more than one million slum dwellers in Delhi have been displaced, a period during which the pace of slum demolition has increased starkly. The combined number of slum, or jhuggi jhompri (JJ), clusters demolished by the Municipal Corporation of Delhi (MCD) and Delhi Development Authority (DDA) over the five years leading up to 2000 (1995-99) rose more than tenfold over the next five years (2000-04).*

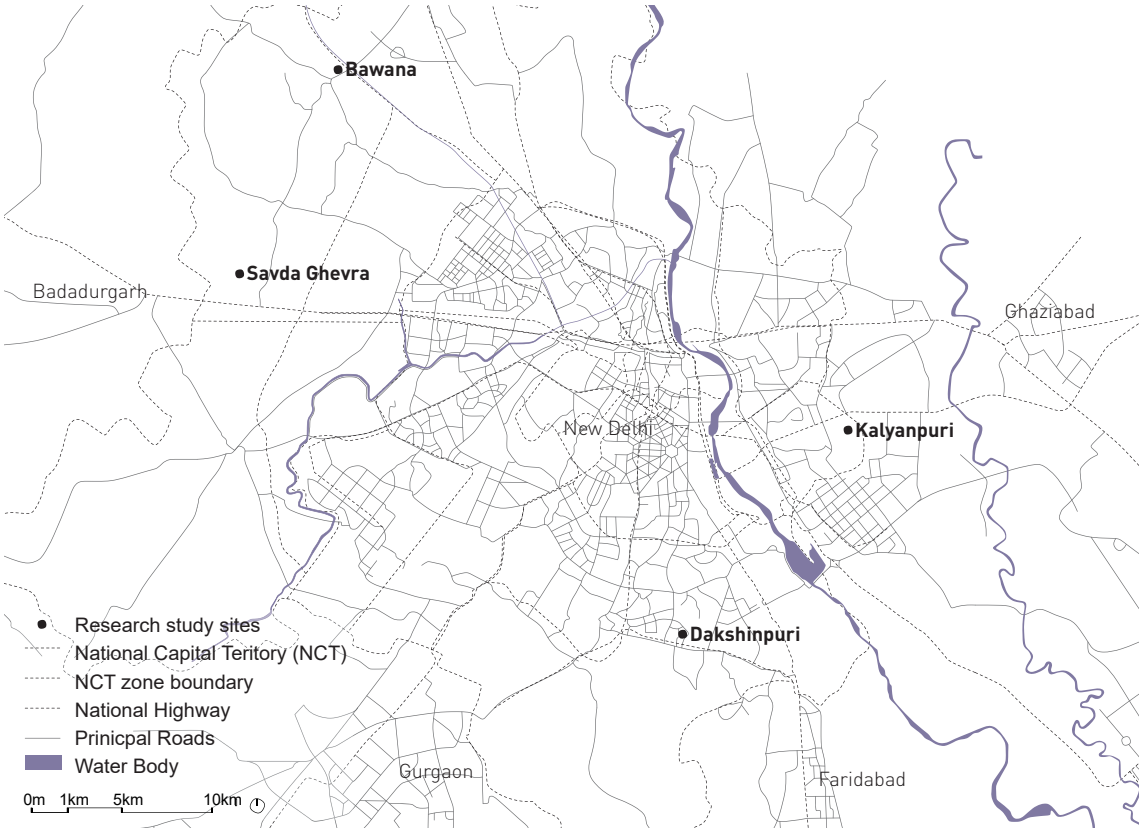
Most of these million plus slum dwellers have been relocated to peripheral land on the urban fringe. In his article, "The Structure and Dynamics of the Urban Fringe of Delhi", Thakur (2011, pp. 172-173) writes that...

> *The most important aspect about the urban fringe is that its land space handles most of the conversion from rural to urban and associated urban land uses as the population of cities grows. ... [such] growth is very fast in Delhi as compared to other cities in India ... due to the non-availability of any physical barrier around the city. [As a result the] city is expanding in a haphazard manner beyond its administrative boundaries into the surrounding rural areas due to the absence of a regional approach in city planning, lack of coordination in the plans of multiple planning agencies and lack of proper resources. Delhi's fringe is also characterised by an unplanned shift from agricultural to mixed urban land uses, scattered urban development, misuse of natural resources, environmental degradation, and inadequate provision of infrastructure services.*

The emerging pattern is that of urban sprawl (or mega-regions) - a configuration of two contrasting types of development: the growth of large peri-urban areas with illegal and informal land uses that have little, or no infrastructure or services; and suburban sprawl with commercial and residential complexes for the middle and upper classes connected by individual cars rather than public transport (UN-Habitat, 2008, p.11).

1.6 AREA OF RESEARCH; SAVDA GHEVRA, BAWANA, DAKSHINPURI AND KALYANPURI

The area of research, although focused on Savda Ghevra, covers three other resettlement colonies. Bawana, established at the same time as Savda Ghevra, and Dakshinpuri and Kalyanpuri, established earlier, which provide an idea of what the new colonies might become in the future (Map 1.1).



Map 1.1. LOCATION OF STUDY SITES.

Savda Ghevra, the largest planned[8] resettlement colony (CURE, 2010, p.4), was originally developed by the Slum and JJ wing of the Municipal Corporation of Delhi (MCD) and then taken over by the Delhi Urban Shelter Improvement Board (DUSIB)[9] in 2006. The 250-acre site is located about 40 km west of New Delhi and is home to more than 8,500 families (approximately 46,000 people) evicted from inner city areas. The residents come from slums in the city centre and on the city's development corridors – notably sites along the banks of the Yamuna, settlements around the airport and landmark sites in the city centre such as Humayun Road, Nizzamuddin and Lal Bagh (Table 1.1[10]).

Savda Ghevra provides a very marginal civic experience. Water is provided by tanker, which means that women have to wait to collect water and then carry it to their homes. The plots are too small to develop vertically. General health is compromised by the lack of any holistic sanitation, and the site is located so far from the city that accessing work is difficult and costly.

List of JJ Clusters relocated during the Last three Years				
2006-07				
S. N.	Name of JJ cluster	No. of families	Relocation site	Block
1	Eastern Yamuna Pushta	3260	SG	K,B,A,C,D
2	Nagla Machi	919	SG	G,H
3	Lal Bagh, shahadra	106	SG	B,K
4	Indra Camp,jhilmil	133	SG	B
5	D- Block,tagore Garden	160	SG	O,C,B
6	Lucknow road,Timarpur	74	Narela	J
7	Nagal Dewat,IGI airport	1730	SG	G,H,L,M,N,O
2007-08				
S.N.	Name of JJ cluster	No. of families	Relocation site	
8	RUB,Barapulla, Nizzamuddin	90	SG	O
9	Water body, naraina	226	SG and Bawana	ON
10	Rajiv Camp, Karkarduma	136	SG	G,H
11	Okhla	3	SG	J
13	Trilok puri	11	SG	J
14	Rohini Sanjay Camp	100	SG	L
15	Amer Park,Zakhira	103	SG	G,H
2008-09				
S.N.	Name of JJ cluster	No. of families	Relocation site	
16	Harishchand matur lane	18	SG	J,K
17	JJ cluster near aditya apartment,NH24	133	SG	J,K
18	JJ cluster Humayun Road	260	SG	J
19	Raghuveer Nagar	600	SG	O,M,N,L
20	JJ cluster,continental club,Dr. Rajender prasad road	3	SG	J
2010				
S.N.	Name of JJ cluster	No. of families	Relocation site	
21	Khan Market	431	SG	J,G,H
22	Nizzamuddin	18	SG	O
2012				
S.N.	Name of JJ cluster	No. of families	Relocation site	
23	Lodhi Coloney	39	SG	O

Table 1.1. LIST OF JJ CLUSTERS RELOCATED TO SAVDA GHEVRA. Source: (c) CURE Savda Ghevra Offices 2013, unpublished

It is important to note that the Indian constitution underlines the importance of 'the right to an adequate means of livelihood'. "The Constitution identifies certain 'fundamental rights', such as freedom of speech and association and equality before the law, but also delineates a set of specific social and economic entitlements under the 'Directive Principles of State Policy', including 'the right to an adequate means of livelihood', 'free and compulsory education for all children', and 'the right to work'." (Sen 2005, pp.36-37). The site is very large and remains partially occupied. Divide into blocks the site is bounded by a waterway to the north, a main road to the west which runs into the site and is one of the busiest roads, and constriction of low rise apartments south west (figure 1).

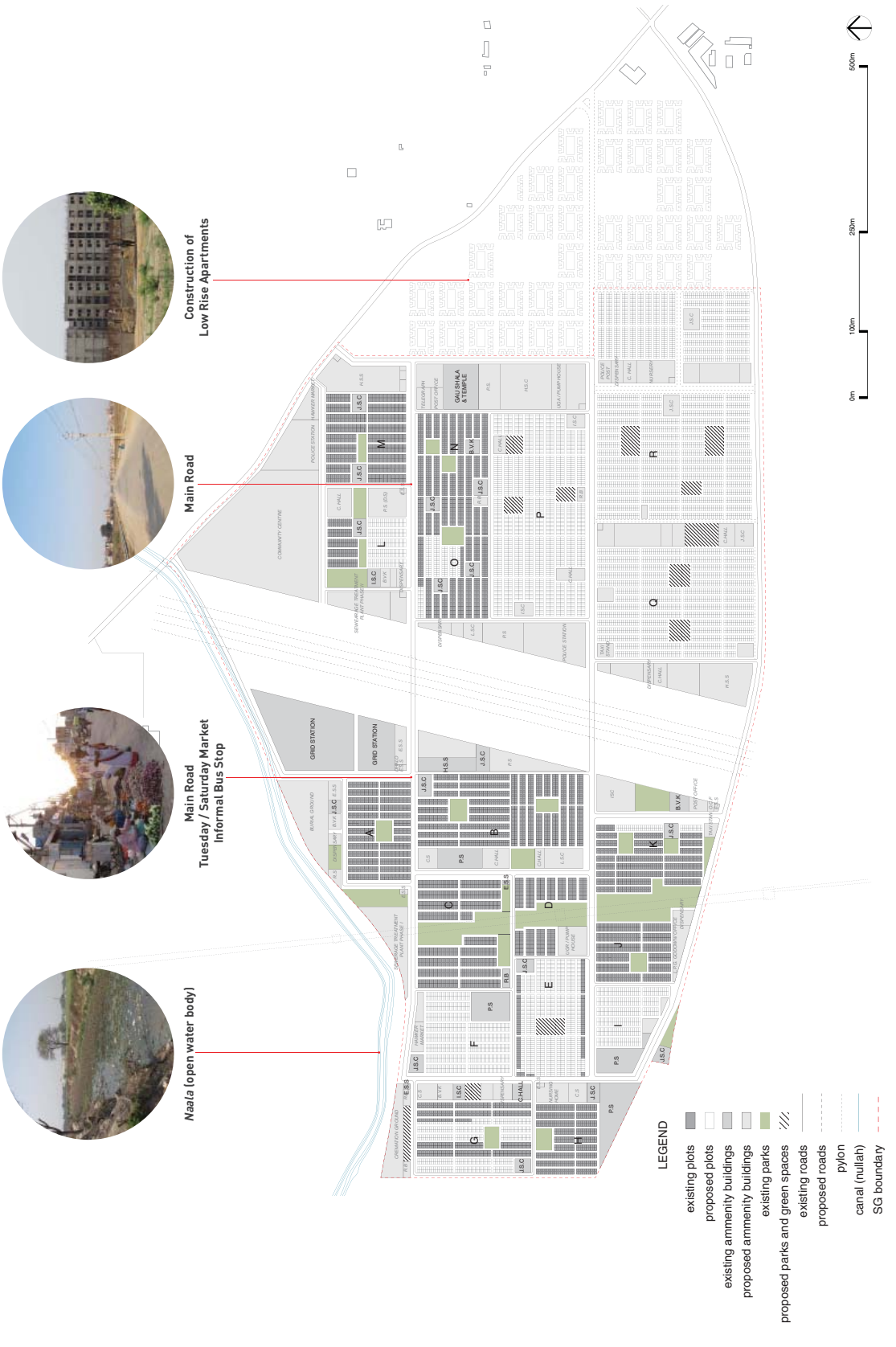


Figure 1.1 PLAN OF SAVDA GHEVRA. Source: Redrawn from maps from the Municipal Corporation who planned the site.

The resettlement of Savda Ghevra does not involve housing[11] but simple relocation on large semi-serviced blocks of plots. Whilst prospective residents were enticed with notions of property ownership the reality was a half promise. Residents were offered a 10-year lease, articulated as tenure, with the ability to extend at the end of that period but prohibiting re-sale at any point. These curbed interpretations of property ownership are not new and standard policy as a strategy to mitigate against re-sale, forcing the intended beneficiaries to stay put. The lease is for a plot which was then, and still is to date, developed as per the means and resources available to the allottee. The result is an urban formation that is the accumulation of multiple individual decisions (image 1.1). The plots are arranged linearly and are contiguous on three sides with neighbouring properties resulting in an urbanity on plan of regularity in contrast to the spontaneous traditional development associated with illegal slums. Despite this formal planning the site has not developed in a consistent manner – this is in part because the existing infrastructure supplied by the government remains un-built or incomplete but mainly because the relocated families have mostly incrementally 'self-built' their homes (image 1.2). There are currently what can be loosely described as three types of housing in Savda Ghevra - a categorisation that has been developed and adopted by researchers and NGO facilitators working in the area rather than a lexicon used by the residents:

(1) *Kuccha*: houses made with temporary building materials such as bamboo and tarpaulin

(2) Semi-*pucca* : houses with brick walls but corrugated tin roofs (i.e. cannot take loads)

(3) *Pucca*: houses made of reinforced concrete and load-bearing brick walls and roofs.

These terms are all explored further in Chapter 3.5.

Image 1.1. HOUSES IN SAVDA GHEVRA.

Image 1.2. ROOFTOP VIEW OF SAVDA GHEVRA.

Bawana, like Savda Ghevra, was developed on the back of the 2010 Commonwealth Games also with the intention of housing slum dwellers from high value inner city areas. The resettlement plan of Bawana involved the planning of a site and service scheme much like Savda Ghevra but it also contains a series of low rise apartment blocks located a kilometre away (image 1.3). The apartments provide a contemporary comparison to the site and service incremental construction of Savda Ghevra. Developed as a Public-Private-Partnership the 'Rajiv Gandhi Housing Project' is the first mass housing scheme built during this period aimed at partially re-housing slum dwellers but also for industrial workers. The Rajiv Gandhi Housing project delivered site includes 3164 apartments in four-storey blocks with an area of either 31.6 sq m or 37.7 sq m and are fully serviced with water, sewerage and electricity.

Image 1.3. APARTMENTS IN BAWANA.

Dakshinpuri (image 1.4) was established in 1978 in a grid-like manner similar to Savda Ghevra. Like Savda Ghevra metered electricity is supplied to each plot by Brihanmumbai Suburban Electrical Supply (BSES), a state owned electricity and transport conglomerate. Water is provided via bore wells installed by the Delhi Jal[12] Board (DJB) which is switched on daily for one and half hours. Originally residents would carry the water to their homes to store in large plastic containers and over time residents have installed pumps directly to their homes. Although the water is theoretically safe enough to drink, because of a lack of maintenance and especially during monsoon flooding, the water has been known to be contaminated leading to outbreaks of various diseases.

Image 1.4. ENTERING DAKSHINPURI.

Kalyanpuri (image 1.5), also established in the 1970s, was part of a city-wide government initiative to push the city boundaries eastwards across the Yamuna rivers into what is called trans-Yamuna. Both Dakshinpuri and Kalyanpuri have developed their plots in similar ways. Whilst the plots in Savda Ghevra are 12.5 or 18 sq m, the plots in both Kalyanpuri and Dakshinpuri are significantly larger at 25 sq m.

By making Savda Ghevra the principal location of my fieldwork I was able to carry out an in-depth study and actively participate – through live projects – in its making and development, focusing on civic development through sharing and incrementalism. Bawana offers a contemporary comparison to both incremental self built construction and masterplanned apartment blocks. The two 'historical sites', Dakshinpuri and Kalyanpuri, were developed in a similar manner to Savda Ghevra offering insights into how Savda Ghevra might develop.

Image 1.5. HOUSING IN KALYANPURI

1.7 STRUCTURE AND CHAPTER SUMMARY

The research examines the extent to which sharing and incrementalism is possible and how useful is this process in promoting and institutionalising freedoms. In the absence of full government provision there have been a range of institutional arrangements from formal to informal that seek the participation of residents in shaping the environment around them. In tackling the research a series of questions and propositions have been tested / examined through the medium of live projects and ethnographic surveys on the ground.
The body of work is divided into four Chapters:
(1) the introduction which includes the literary context, research question and area of study;
(2) methodology;
(3) the main empirical work;
(4) analysis and conclusions.

Chapter 1, this chapter, has reviewed the conceptual framework within which the study is located. It began by looking at the research topic leading to the research question. The key themes: freedom (to participate), sharing and incrementlism were set within the literary context. The topic was then situated in its geographic and historical context – which provides a review of resettlement colonies in Delhi and finally concluding with this summary.

Chapter 2 presents the methodology used to carry out the research centred on live projects as a way to provoke responses from the environment that question when / what / how / where is incrementalism and sharing most effective in terms of engendering freedoms and the making of a civic order and 'town'?.

Chapter 3 is divided in two parts. Part One details the live projects at three scales ranging from the (smallest) hand-made objects smaller at the scale of the house or plot to the (largest) at a neighbourhood scale. All the live projects engage with the question of how sharing supports and engenders incrementalism. Part Two presents survey work predominantly in Savda Ghevra but also Bawana, Dakshinpuri, and Kalyanpuri. The work expands from a series of basis questions: what do people share and how much of this is incrementally shared?

At what scales does sharing happen? Is it just in building houses or is there sharing with neighbours? Furthermore, where there are shared resources and what kinds of institutions are required to avoid the 'tragedy of the commons' (Hardin, 1968)? Here the researcher observes the city through the lens of conflict, negotiation, accommodation and collaboration where neighbourhood culture is understood within the framework of a common ground. House to house measured surveys supported by interviews with residents were carried out to explore the meaning of incremental in the context of Savda Ghevra. The survey sought to examine the following two questions:

(1) How incremental is Savda Ghevra within the definition articulated in this Chapter?

(2) Does positive incrementalism result in upward mobility and how is that related to accessing freedoms and the making of a town (civic order)?

Throughout Chapter 3 the research reveals what kind of institution building happens, if at all, alongside incrementalism and sharing and why this is important. It also reveals how these institutions can eliminate unfreedoms and contribute towards the making of town. The final Chapter 4 draws tentative conclusions from the empirical work in Chapter 3 and proposes a trajectory for future research within the subject area.

2 METHODOLOGY

This PhD examines how shared incrementalism might assist in making a claim to participate in the city and provide a way of going about this. The research is concerned with how sharing and incrementalism is operationalised by those who are physically and economically marginalized: in this case the residents of Savda Gherva resettlement colony in Delhi. The contemporary megacity is a place which is defined by the way certain polarities are juxtaposed: the centre and the edge, modernity and tradition, local and global, religious and secular, factory-based technology and craft, loose and tight-fit constructions. As an ongoing case study of an Indian resettlement colony, Savda Ghevra, located at the edge of the city, offers a lens through which to engage with local expression of incremental adaptation, and improvement, of small initial investments by families in their homes during periods of rapid change during everyday life. As such Savda Gherva and resettlement colonies generally provide a fertile empirical research environment.

The methodological framework of a PhD by Practice, in the field of Architecture, is rooted in the pursuit of learning-by-doing in addition to field work observational outputs. Learning-by-doing and by encounter is useful in this context because it is true to how cities are experienced and how they change and develop. It is also true to the way architectural knowledge is constructed, which is partly through conventional research methods (found in science or the humanities) but to a large extent also through unquantifiable means. Because cities like Delhi are characterised by physical and visual contractions traditional observational methods are limited. In this context making (doing) is a useful strategy for engaging with and provoking ideas and responses from a community. Learning by making, a methodology rooted in action, is a way of extracting knowledge from a context which is as much about doing and as it is about observation. This methodology posits that, particularly in contested and marginalized city spaces, the architect must evolve from the endeavour of the lone genius to one of a collaborative maker. Thus architecture is understood as a tool for engagement and dialogue, empowering communities to contribute towards the shaping of their city. Here the role of the architect goes beyond that of design to encompass a whole range of skills from finance, political lobbying, fundraising, community liaison and the traditional skills of design development and project delivery. This approach to architecture (and the methodology of this research) emphasises the process as opposed to the final product. There are three rationales for this approach which are relevant to the research question and scholarly context as outlined in the introductory chapter.

Firstly in *Development as Freedom* Amartya Sen argues for a conception of development linked to the creation of capabilities. However, the literature remains mostly at a theoretical level. Duflo (2006) calls for a bottom up approach to counter Sen's top down version, claiming development economics must take the lab into the field. Here I seek to contribute to the literature a more concrete interpretation of capacity building on the ground. Understanding capacities as something that requires active participation. The concern is not just with freedoms and unfreedoms (Sen, 1999) but also with how one actualizes those freedoms and capacities. This is ultimately a practical problem.

Secondly, the concern for shared incrementalism goes beyond the moral question of equitable distribution and social capital (Sennett, 2006 and Ostrom, 1990) but to how one makes a claim and participates in everyday life. Here sharing becomes something tangible with material and cultural qualities. I add to the literature as I present a conception of sharing through the lens of institutions (ranging from legal to primordial) which have physical properties and political

agency. Furthermore, I present a conception of sharing as that which is mobilised by collective resources to physically reconstitute the urban.

And lastly, incrementalism is understood as the gradual accrual of resources over time, a particular necessity in contexts where resources are already limited (Turner, 1972). McFarland and Vasudevan (2014) make the distinction between incrementalism and insurgency, the former concerned with how a claim is made as opposed to the effect it has. This research is less interested in drivers of incrementalism but how to identify an opportunity for intervention which is understood as an architectural project as this has spatial and material repercussions. Using the role of the architect within this context enables a discovery process of exactly how the residents invest in their physical, cultural and political environment and how that topography changes as a result of this investment.

What is significant here is not only that shared incrementalism mobilises political action and social experimentation but that it is volatile and always shifting in relation to space and time. All three rationales are a call for understanding research as a practical design problem, rooted in everyday life and recognizing the value in engaging with real, on the ground processes which make the city. It is important to note that this is an active yet simultaneously reflective process. As such my method, although the active and reflective process are not distinct but complementary, is divided into two parts: (1) research by active making and (2) research by direct observations.

The empirical body of work, Chapter 3, is also divided into two complementary parts which reflects the methodology. The first part of the Chapter explores the extent and significance of incremental(ism) and sharing in three live projects initiated by the author. The second part is research by direct observation - exploring how much incremental(ism) and sharing there is in Delhi resettlement colonies. The second part begins with a study of sharing and incrementalism in Savda Ghevra with a focused study of two blocks. Then as a counterpoint to the incrementalism seen in Savda Ghevra, apartment blocks constructed in Bawana are explored and finally the chapter compares the issues raised against two older resettlement colonies set up in the 1970s, Kalyanpuri and Dakshinpuri. Two modes of praxis are constantly in play between action and reflection. The Chapter is based on field work conducted during ten visits to Delhi between 2010 and 2013 during which a total of 30 weeks were spent in the field.

The research aims to build on the ambition of the research group of which the author is a part: the Architecture of Rapid Change and Scarce Resources (ARCSR) at London Metropolitan University (now the Sir John Cass, Faculty of Art, Architecture and Design). Originating in 2002, ARCSR is a long-term research and education grouping set up to investigate the architecture of rapid change in transitional urban settlements as an aid to intervention (Mitchell, 2010). This programme, in particular over the past five years, has explored the diffuse frontiers of peri-urban settlements that surround expanding/burgeoning cities, which is one of the most marked of contemporary 'urban' phenomena. The methods employed in the studio - and used for parts of the PhD programme - learn from practice-led iterative architectural endeavour with an emphasis on participatory methodology with the researcher (or students in the case of the studio) embedded in a live setting through active engagement with experimental live projects. Operating within an existing academic framework and body of research enabled crucial connections to be made which directed the field of study to Savda Ghevra. First and foremost ARCSR had been working with the local Indian NGO, the Centre for Urban and Regional Excellence (CURE) for five years prior to the start of the research. CURE operate out of its Delhi

offices in more than five cities, working with poor communities advocating urban change at the grass roots. Historically the emphasis of its work has been on livelihood and capacity projects but increasingly CURE has become concerned with infrastructure, notably sanitation and water supply, and the associated practice of place-making. CURE had been operating in Savda Ghevra since the resettlement colony was established in 2006 and had crucially gained trust with various clusters of residents. Secondly, enabled by CURE, a team of researchers from ARCSR had been to Savda Ghevra in July/August 2008 and had produced a report containing designs for cooperative houses and surveys of existing housing 'blocks' which offered an opportunity to expand and develop this research further.

2.1 RESEARCH BY ACTIVE MAKING

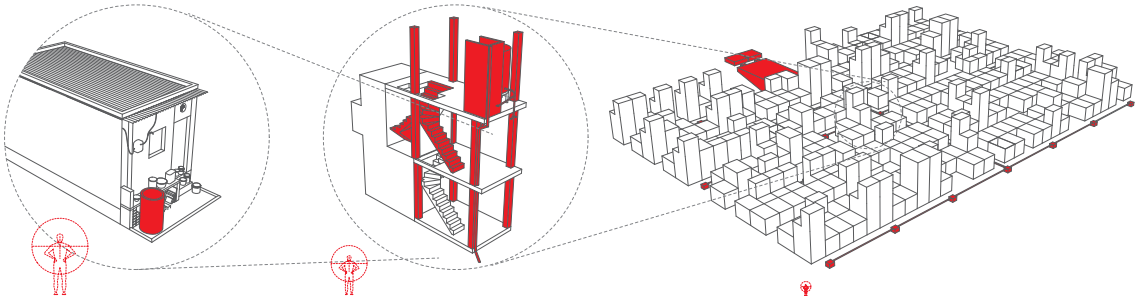


Figure 2.1 LIVE PROJECTS. This is a diagram showing the live projects at the three scales (house, street, neighbourhood).

The central focus of the work is based on the methodology of action-based research or participatory ethnography: the practice of learning by embedding oneself in the delivery of a live (real) project within a local, distinct context. In order to engage with a range of issues from the individual to the collective the method of engaging by making occurred at three architectural scales: that of the house, street and neighbourhood (figure 2.1). The first live projects, at the smallest scale, are a series of built artefacts which explored the opportunities for making ferrocement objects on site, as opposed to purchasing factory /readymade products. The first prototypes were made (by the author) as an individual exploration at the Centre for Alternative Technology (CAT) in Wales; and then subsequently a training (technology transfer) workshop was run in Savda Ghevra with 15 masons (men and women). Two things happened here: the arrival of a new technology capable of complementing the existing form of urbanism, a process of small changes; and the use of making as a form of gaining access to local builders and masons. Making breaks language and gender barriers critical for a foreign woman in the Indian context. The second live project was the design and build of one house and an extension of another house, back-to-back, serving two plots in Savda Ghevra. The process of making the house placed the author at the heart of the action by which housing is delivered in Savda Ghevra. Here the researcher took on the role of part observer, part project consultant and part project architect (designer) and the whole process was documented through photographs, drawings, interviews, and direct observation first hand (by the author) and second hand through CURE. Housing is at the heart of what it means to be an urbanite, but there is little evidence

of how housing in a place like Savda Ghevra is delivered, at the household level, outside of formal state or market mechanisms. Mike Davis in his seminal book claims, "overcrowded, poorly maintained slum dwellings, meanwhile, are often more profitable per square foot than any other types of real-estate investment" (Davis, 2007, p.86). The methodology of embedding oneself in the design and procurement of an individual house, seeks to contribute as such to this literature.

The last of the live projects was the design and build of a decentralised sanitation treatment infrastructure which catered for 322 houses in 'A' Block, Savda Ghevra. This project, operating at all scales, was provoked by the difficulty and indignity suffered by the residents of having to defecate in the open, the consequent desire to have in-house sanitation, the community structures formed to promote cooperation to that end and the design and management of the final project.

Research by active making emphasises the focus on the social, cultural and political interactions between individuals and their physical environment at three different scales: that of dwelling, street and neighbourhood. The act of dwelling was seen initially as a process of transformation which became a 'spectrum of opportunities' directing the research towards the overlap of opportunity, investment, finance and security. The focus on dwelling led to the larger question of belonging, participation and allegiance in the context of a marginalised slum neighbourhood in a 'world class city' (Ghertner, 2011(a)). The need to explore the site over three scales was informed by the observation that the interface between door and street is central to an understanding of urbanity in a place like Savda Ghevra which is found in small gestures such as platforms and extensions all the way through to political organizations and urban plans. Initial work tried to understand how street life existed but what became clear was how the variability of the house's form generates different sequences which give depth to the idea of a street. How to record, document and analyse this 'depth' became a central theme of the work. Going up a scale it was always important to reconcile the autonomous individual with the common whole – at a neighbourhood and even city scale. How to distinguish and record the various forms of institutions that exist from family all the way through to political representation at a neighbourhood scale emerged as the thread that ran through all scales.

2.2 RESEARCH BY DIRECT OBSERVATION

The method of direct observation or learning-from-context takes inspiration from Patrick Geddes, an urban planner and sociologist working in India – he held a position in Sociology and Civics at Bombay University from 1919 to 1925. Geddes championed a mode of planning that sought to improve the existing fabric as opposed to initiating a process of tabula rasa which involves sweeping existing inhabitants off the map before constructing anew. His motto 'diagnosis before treatment' was a call to offer a 'diagnostic survey' (Meller, 1990) – a fine-grained approach to documenting place. In this spirit research by direct observation employs methods from scientific survey for social sciences seeking out sources of data, using existing data bases, walking, observing and conducting new surveys.

This research is concerned with the way architecture is experienced - found outside what can be measured; in the phenomenal realm - the methods used to pursue the research are part of an emerging field in architecture which draws from ethnography (anthropology and sociology) combined with visual and spatial analysis (Barac 2011; Hall, 2013). The participatory ethnographic method is required not simply because statistics and data don't offer a sufficiently

extensive explanation of the experiences encountered, but also because the nuances of social interactions require a finer-grained (Hall, 2012) approach. Architecture is viewed as a vessel for social interaction and social processes rather than simply in terms of form. Architect and urban researcher Matthew Barac, offers a methodological framework for architectural research concerned with ordinary and everyday experiences of marginalized urbanites. Barac writes that the task for such research is what Hentschel and Press (2009, p.6) define as "the need to find a methodology that can hold all the modalities of 'city being' in the same gaze" and further, a mode of engaging – of "looking at the 'right' things through the 'right' lens' and doing so ethically' (Barac, 2011, p.4). Barac situates his work on African cities within an existing and emerging concern for 'everyday urbanism' (Amin and Thrift 2012, Hall 2012) where 'cityness' (and particularly in informal contexts) is, as geographer Ash Amin writes 'almost impossible to distil as a methodology for scientific research' (Amin and Thrift, 2012, p.11). Initially research looked historically at the socio-cultural context in which resettlement colonies were established in Delhi. Using existing literature which documented this change, a series of drawings were produced which took maps from the literature (Dupont, 2001), maps from the Delhi 2011 and 2021 masterplan (available through the website of the DDA, see bibliography), Google maps, maps showing the increase in urban areas developed by the author and finally adding a new layer of recent resettlement colonies from a list sourced from the Municipal Corporation of Delhi (MCD); see Drawings 3,4 and 5 as part of Appendix Two: Portfolio.

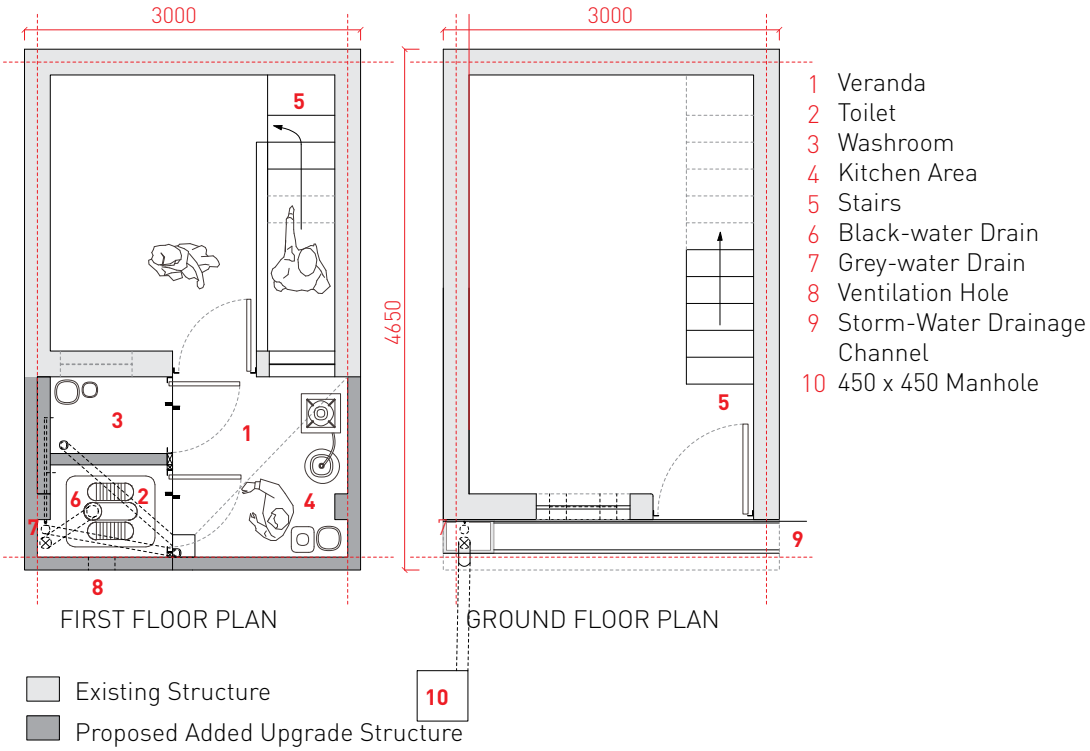
Using the architectural tools and techniques of spatial analysis (photography, drawing and collage), initial survey work was based on observing Savda Ghevra over time. This involved both passively observing the street to see how activities unfolded and actively by entering someone's home as a dinner guest or similar. Observing the site over time resulted in a record of how the physical landscape was used for a series of social and cultural interactions and how these changed. This type of immersion was valuable but I had to recognize that my mere presence has agency in particular because in parallel I was working on real projects. Thus the role of observer embraced the active role benefiting from the access that this gave me to observe and document processes in situ. The engagement became (from an ontological position) part of the research. This was documented in the form of ethnographic drawings, and personal narratives (told throughout Chapter 3). Conversations with residents were at times structured – measured surveys of the built fabric with pre-prepared questions for the residents – with a range of different families in different circumstances. Twenty-four detailed household surveys were conducted in Savda Ghevra during fieldwork ranging in content from interviews about family history, to more focused and enumerated surveys relating to household sanitation and water supply; paralleled by five household surveys in Kalyanpuri, two in Dakshinpuri and two in Bawana. However, much more was learnt by simply being there over a period of time, 'hanging out', and engaging in random conversations. These conversations were recorded by taking notes. On one trip, when speaking to a group of residents, suddenly all the women left very quickly. It turned out the water tanker had arrived, so they had all rushed home to get their buckets to collect and carry water back for their household supply. Seeing this urgency in action had a far more profound effect on my understanding of the problems of living and working in Savda Ghevra than conversations with social workers or reports that highlighted the problem of an irregular water supply, for example.

The household surveys were completed in three rounds, documented in Chapter 3.5: (1) survey of 'A' Block recording the house types (726 houses); (2) survey of 'M' Block recording house types (608 houses) both of which were expanding on work done in 2008 by ARCSR students; and (3) door-to-door sanitation services survey of 109 houses in 'A' Block; and door-to-door

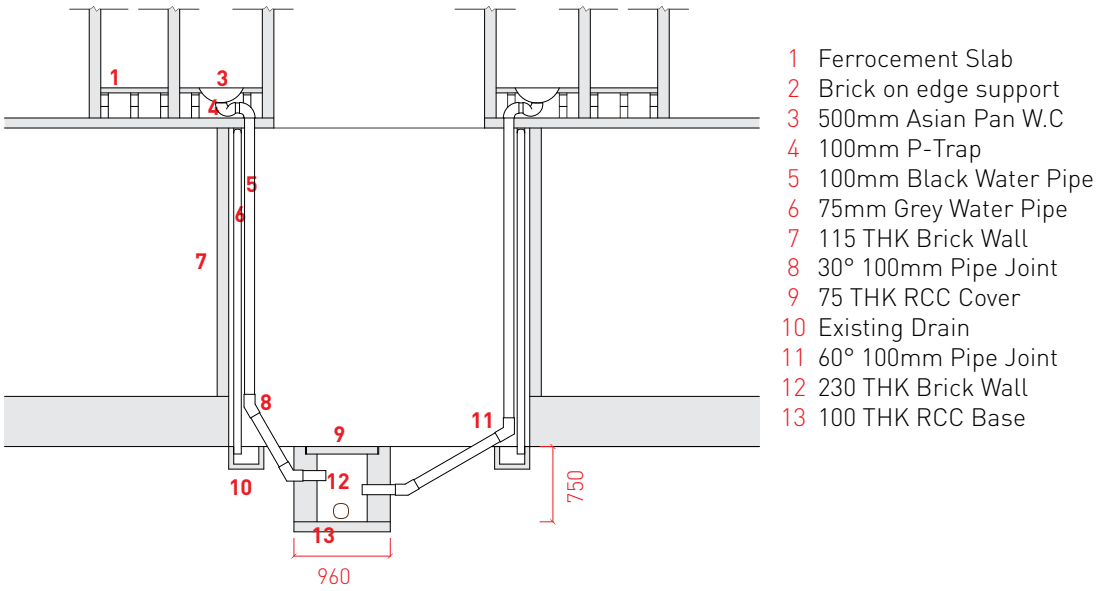
house type, transformation, sanitation and water survey of an additional 324 houses. These surveys were analysed using drawings and graphs to represent the data and showed what kind of changes were happening which were analysed against the oral narratives and literature. The third survey was completed with the help of CURE. Additional survey work conducted by students at the Guru Gobind School of Architecture led by Bashabi Dasgupta, although not used directly in this body of work, provided insights at early stages. Working with a group of four students the author collaborated on a workshop which proposed small scale improvements to the Aga Khan Trust (AKT) developed housing (figure 2.2) further documented in Chapter 3.4.

'Community (resident) workshops' and 'street meetings' organised by CURE as part of their ongoing work in Savda Ghevra were often opportunities to engage with a wide range of audiences. Meetings were often structured around an issue such as waste collection, sanitation or livelihood so the challenges and the way the individual residents were trying to transform their lives out of poverty was brought to attention. Sitting on the sidelines was not only a process of looking in on a development non-governmental organization (NGO) focused on helping people help themselves but also enabled an understanding of the active role an NGO like CURE plays, in the absence of the state, in a place like Savda Ghevra. Access to CURE's socio-economic study of Savda Ghevra which included key issues and stakeholders served as an important foundation for the work (CURE, 2010).

Working in tandem with CURE allowed for there to be significant observation and research through active engagement with their projects reviewed in Chapter 3.4. Field work observations of CURE's work, such as the borewell case study, was recorded from conception, all the way through to execution and operation. Other initiatives such as waste management strategies and composting were only observed for part of their operational or project life. Figure 2.3 shows the various live projects initiated by the author and those observed and the interplay between them. What this diagram shows is the cross-fertilization of ideas between projects observed and initiated.



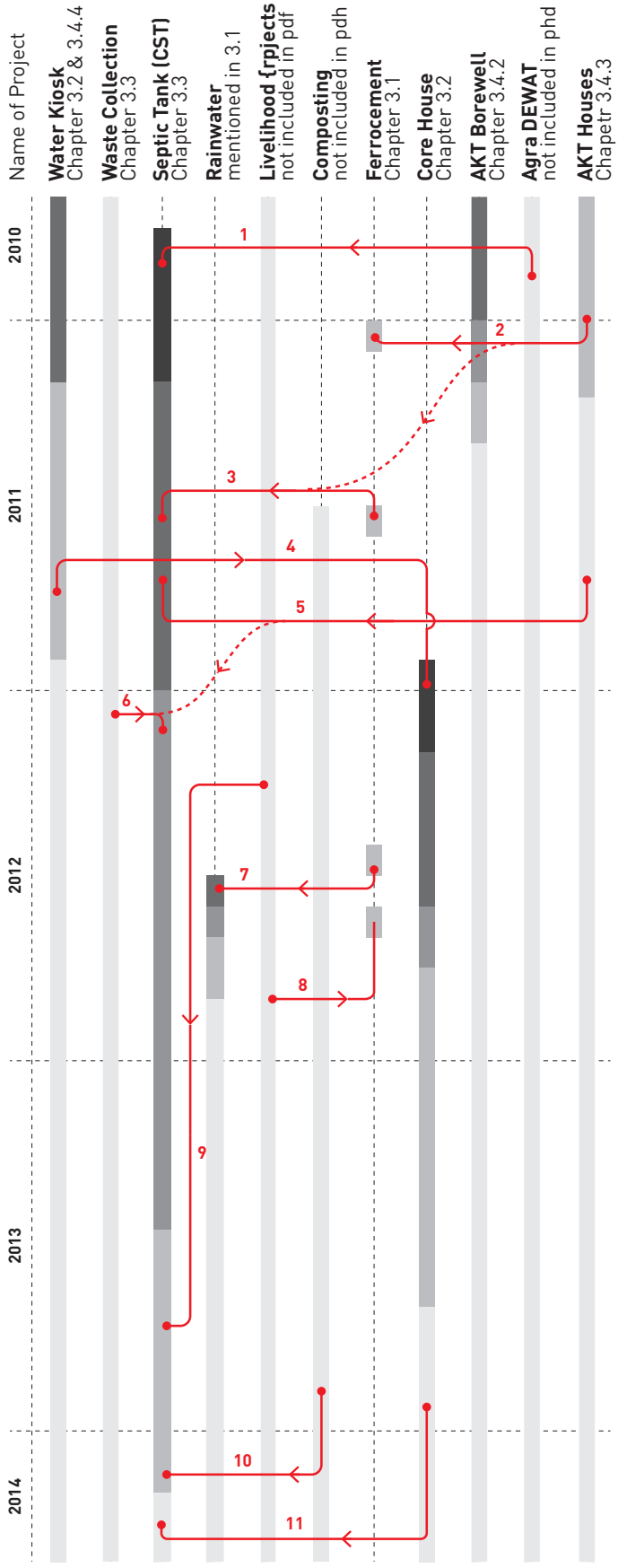
PROPOSED FLOOR PLANS FOR TYPICAL UPGRADE



PROPOSED SECTION THROUGH SANITATION UPGRADE

Figure 2.2 AKT STREET SECTION. This section showing how the houses could be serviced with sanitation was one of the materials produced by the author in collaboration with students from the Guru Gobind School of Architecture.

Figure 2.3 (next page) PROJECT INTERPLAYS. The method of embedding oneself in a rich local context allows for learning to happen iteratively across multiple projects.



1. The success of the DEWATs in Agra (done by other researchers within ARCSR) greatly influenced the sanitation project at the early stages.

2. Interviews and workshops on the 'AKT' Houses project influenced the first of the ferrocement objects.

3. Exploring the use of ferrocement for small scale septic tanks influenced early design work for street level sanitation.

4. The Water Kiosk project influenced the programme and financing model for the Core House.

5. Learning from how families in the 'AKT' street were not prepared to share a street-level sanitation system the projected jumped in scale and changed location.

6. Because a community waste collection system was up and running in 'A' Block we decided to site the Sanitation Project there.

7. Following the ferrocement workshop participants built a shared rainwater harvesting and groundwater recharging system out of ferrocement.

8. The last workshop was inspired by one of the livelihood sowing projects imagining that these women could sow the moulds for the ferrocement objects. This was tested in the last of the ferro workshops.

9. Following numerous unsuccessful attempts to secure funding for a sanitation project it was reinvented as a Livelihood project in line with CURE's work; following which the project received funds.

10. The existing community run composting initiative could be expanded to deal with sludge from the sanitation project, closing the waste cycle.

11. The lessons learnt on the Core House are now influencing how houses can upgrade and connect to the sanitation system.

LEGEND

- preparation & brief
- concept stage
- detail & technical design
- construction (if applicable)
- in use

2.3 CONCLUSION ON ACTION AND REFLECTION PROCESS

The methodology described above, although wide-ranging in technique, provided an adequately comprehensive dataset. This has allowed the author to document a proliferation of complex and interweaving institutions, small scale designs, community associations and day-to-day nuances sufficient to reveal new insights regarding the relationship between incremental endeavour and sharing in Savda Ghevra. The live projects provided an opportunity to witness local changes through which local actors remake their town. In doing so these actors are testing and reconfiguring their urban citizenship and shifting the range of opportunities available to them in the city of Delhi.

There are three points of critical reflection, or lessons learnt, which contribute to the field of architecture in the context of development and the pursuit of a PhD-by-practice in terms of methodology: (1) the architectural tools of communication, a visual intelligence, to operate; (2) the role of practical wisdom to navigate the complexities of an environment like Savda Ghevra including but not limited to power relations, the role of the architect outside of a standard contract, and the multiple roles required to deliver both the live projects and conduct field work; and finally (3) the role of working in a marginalized context requiring a relationship with an existing NGO and the ethics and positionality of fieldwork.

2.3.1 The architectural tools of communication

The principle challenge for all three live projects, but felt most prominently with the sanitation project, was how to engage and foster support within the community without raising false hopes during the early stages when there was only the idea of project but no permission or funding.

The sanitation project was kick-started with a 'Cards and Chapatti' general workshop, where residents from 'A' Block discussed common concerns including, but not limited to sanitation. The details of this are covered in Chapter 3.3. During this meeting sanitation emerged as the single biggest issue, particularly with women, which enabled us (CURE and myself) to have a conversation about what would be possible - without actually proposing a project. Shaping the forum in this way made it feasible to discuss possibilities without committing ourselves – and risk raising unrealistic hopes. The trick was balancing engagement and optimism against false expectations. The meeting took place in the park, at the centre of 'A' block, which, unbeknown to us, would be the future location of the communal treatment facilities. To a large extent meetings like this (between NGO and residents) are second nature to those involved. In India NGOs penetrate deep into society, particularly for marginalized communities outside of the states gaze, who almost always rely on NGOs for political agency. The way concerns are raised follows implicit rules which go beyond CURE and are part of a collective understanding between NGOs (in general) and the economically weaker sections of society as a way to lobby for change. Implicit in this is the idea that successful participation represents a first step to creating a 'town' even if in the mind of the participant this only means access to water or a toilet. In the first meeting sanitation was identified as the most pressing concern and this enabled the team, to discuss what kind of project could work, how much willingness in the community there was for collaboration and how many people wanted toilets in their homes. Without promising anything, this form of consultation revealed as much about the desires and aspirations of the community as what was technically and financially possible.

The use of diagrams, drawings and models was critical to the successful explanation of projects rather than the ubiquitous architectural plan and section which the lay person finds hard to understand. These drawings were useful because drawing can breaks language and technical know-how barriers. Models showing a range of typical housing conditions and how sanitation would be retrofitted to particular conditions was shown during the process of community consultation. What captured the community's attention was our willingness to actually customise solutions to individual needs, space available, quality of existing structures and the resources available (affordability). This sort of design-play is iterative and becomes itself a social event with political consequences: it engenders a sense of engagement and ownership. There was a universal recognition that this 'tinkering' would not compromise or destroy the residents' existing and hard fought investments. This was crucial to getting the community on board. Here we can see this is not only a method for the PhD but also for design development.

2.3.2 Practical Wisdom

Both the live projects and other fieldwork actions engaged with a methodology best described as 'practical wisdom'. These are intuitive practices of managing discreet, complex and unfamiliar contexts. Practical wisdom is a range of skills: navigating local power relations, finding access to unfamiliar contexts, and the many roles described in this chapter, from observing to design and building; found in the interplay of the methodology of making and observing. In order to access particular groups in Savda Ghevra methods had to shift accordingly. As a woman, interviewing other women, was easier and so survey work favoured access to women. However, men were harder to interview, yet alone find, as they were often working on construction sites during the day. The ferrocement weekend workshop became a neutral space by which builders could be more informally interviewed as they were more receptive and talkative in that kind of workshop environment. Practical Wisdom, is however not only intuitive, but is able to move between intuition and reflection. On the one hand, it grows out of praxis, for whose judgements there is no recipe; rather one must gain experience in practical affairs, learning everything from conversational decorum to procedures for making.

The use of practical wisdom was critical in developing real projects where evidence is coming from discussions on site, climate, negotiations with politicians etc. all reconciling an understanding of real issues. For example with the sanitation project the research began as a way of provoking ideas and responses from the community: what was possible technically set against what the residents wanted. The research then shifted gear as the project materialised and the role became that of an informal consultant, pushing ideas intellectually and assisting CURE in delivering and implementing the project. By the end of the research period the author returned to the role of observer as during implementation control passed back to the street committees supported by CURE (figure 2.4). Here time is represented not just as an abstract notion but rather actual transformation from fear and confusion to 'we can be something political' for the community.

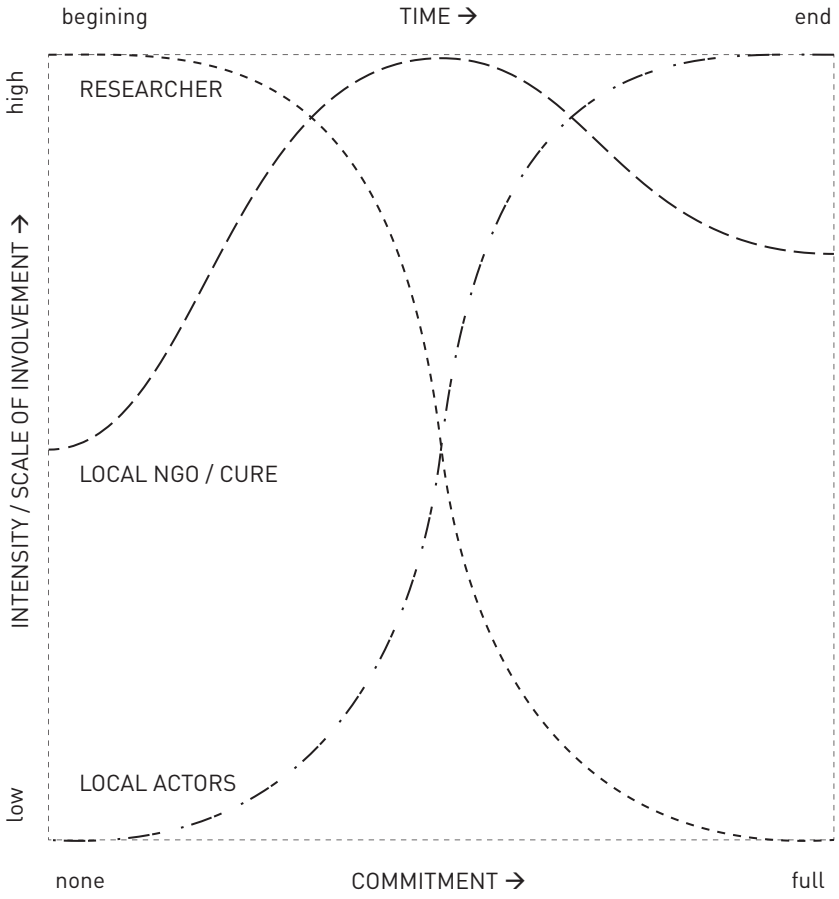


Figure 2.4 THE ROLE OF THE RESEARCHER OVER THE PERIOD OF STUDY. In this diagram the role of the researcher, NGO CURE, and local community are charted comparatively over time. This diagram will be looked at again in Chapter 4 as an analysis piece beyond methodology as it appears now.

In all three live projects the role of the researcher and the relationship with local actors and the local NGO changed over the course of the project. At the beginning the researcher was at the forefront of the projects but over time as local actors become engaged and there was a degree of knowledge transfer (where relevant) the researcher was less crucially involved, understanding when to step forward and back is critical as an architect working in such contested environments. Here the PhD is not about the architect or architecture but how self-empowerments come to be and what is the architect's role (and in this case also the role of research) in this and how does that role change over time.

2.3.3 Access and the role of CURE

The relationship between researcher and CURE was critical, principally in terms of 'access' and the aforementioned 'trust', both of which enabled the work to be embedded in a rich, unfamiliar, context. The relationships between CURE, the residents and the author took time to mature, having evolved gradually throughout the PhD period. CURE runs an extensive organization which manages to meet the complex demands of working in sites which often lack a cohesive group of people and formal planning. This is achieved by having a small specialist team at the top of planners, community workers and project managers who each take responsibility for one (or more) sites. Each site then has one person responsible for that site and all the activities that happen there who is based on the ground. This person will oversee a team of external, mostly social workers, who in turn oversee the work of residents employed by CURE. This enables CURE to have a strong, often large, less specialist local presence in the areas they work in with a clear organizational structure straight to the top (figure 2.5).

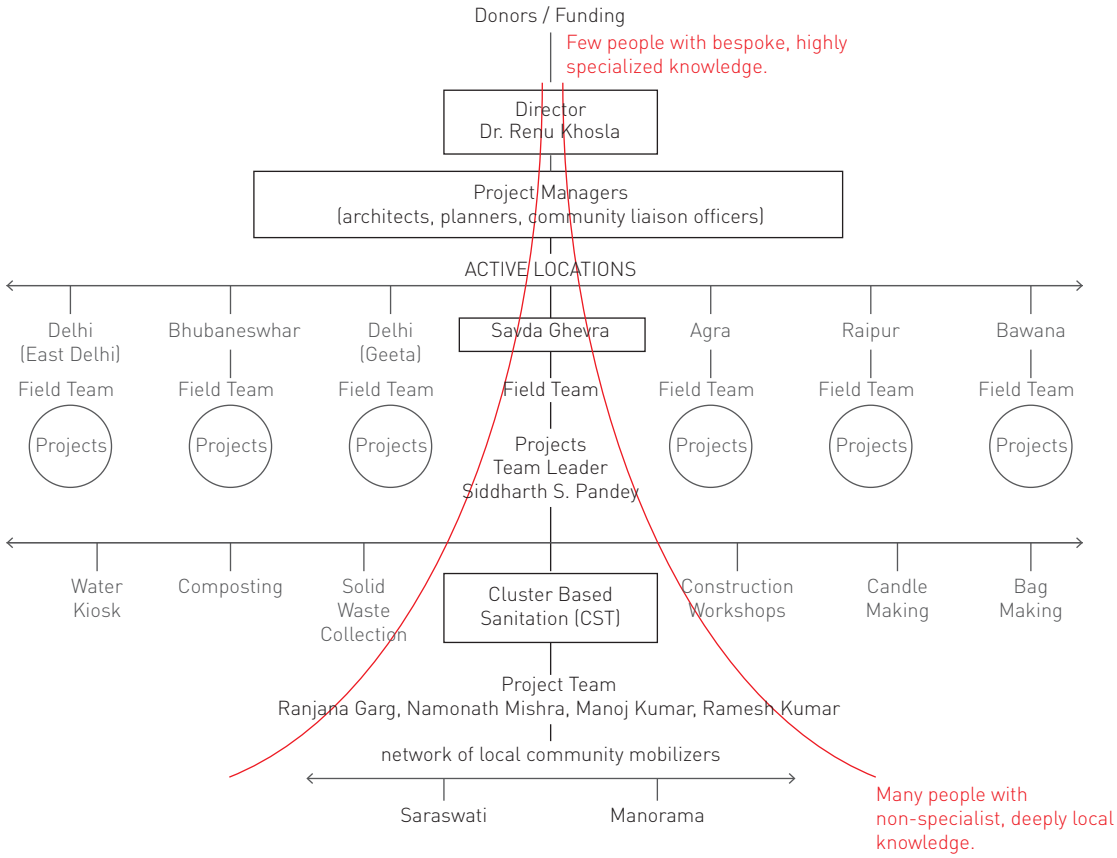


Figure 2.5 CURE'S MANAGEMENT STRUCTURE. This diagram shows the ability of a small organization to have good presence using the structure that supported the sanitation project as an example.

This was also important in terms of navigating local power structures in particular with the local MCD office located just 200m from the perimeter of the site. This method is not simply about building a project but about the relationships which are critical both in terms of method and practice. For any type of construction to happen, in particular works relating to public facilities, permission from the state is required. In the case of the sanitation project to get permission we had to propose a location for the tanks, and this had to comply with the government masterplan for the area. First contact was made with the Delhi Urban Shelter Improvement Board (DUSIB) who took over from the MCD running Savda Ghevra in 2011. A concept plan was presented to a site engineer, an executive engineer, the CEO of DUISIB and the Bhagidari cell within DUISIB. Having made initial contact a formal application was made to the Bhagidari department in the form of an expression of interest to construct the system, under the name Community Septic Tank (CST), in 'A' Block. Bhagidari then forwarded the proposal to the multiple relevant departments including the MCD, DUSIB and Public Works Department. Upon receipt of the application a government field staff (engineer) completed a technical assessment to confirm and validate the project. Following this DUSIB issued formal permission for the construction. This process which took almost a year was spearheaded by CURE who know how to navigate local bureaucratic systems. Figure 2.6 shows the complexity of such relationships where influence and finance is not always coming from the same source.

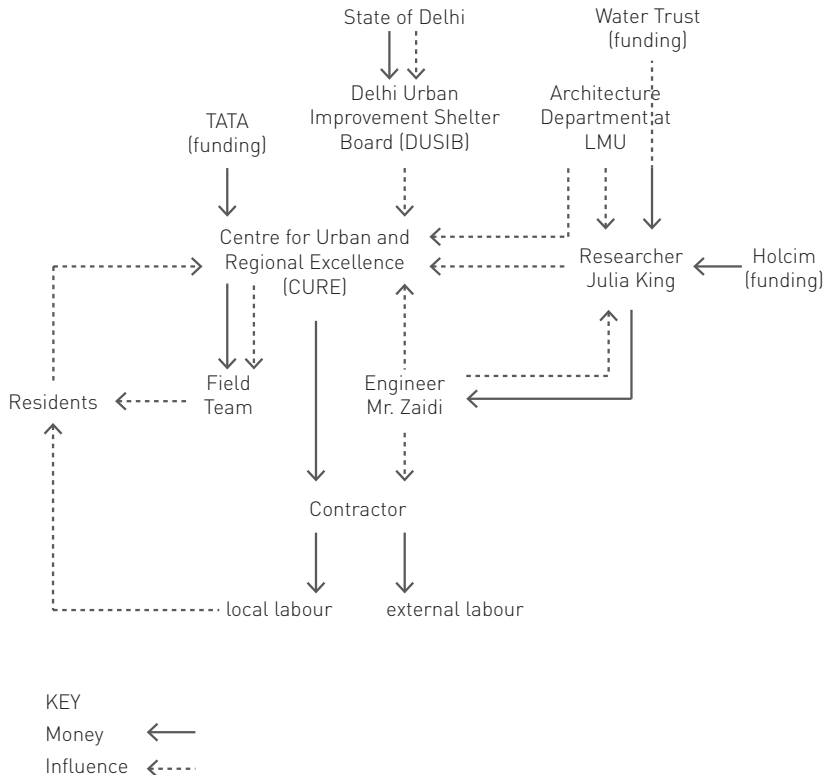


Figure 2.6 KEY PLAYERS IN THE SANITATION PROJECT. This diagram shows the many players involved against the movement of money and influence.

The interplay of communication, practical wisdom and access via a local NGO forms a critical part of the making and observing methodology. The idea that architecture is a tool for engaging with communities is a two way street and involves a certain kind of ethical pragmatism as described above. The architect can not be a lone genius designer but rather take on a generalist role and act as the node point between a range of networks.

In conclusion, classical statistical research methods have difficulty investigating creative urban endeavours over time in informal/slum environments. In contrast the methodology of immersion in making projects employed here was able to reveal particular heuristic narratives of small, dispersed but topically linked live projects which served as a unique entry point to review the rich, complex and rapidly changing environment in Savda Ghevra and other resettlement colonies. Although the research does not attempt to romanticise the 'slum' this methodology does help to provide an understanding of the value of the contribution which the residents of Savda Ghevra make to the metabolism of the city as they carve out their future together increment by increment. The city or civic culture embodied in the topography of place is a location where conditions of self-empowerment cannot be reduced to data or represented as just systems, however useful that might be.

3. MODALITIES OF SHARING AND 'INCREMENTALISM'

PART ONE:
HOW MUCH INCREMENTAL(ISM) AND SHARING IS THERE IN THE THREE LIVE PROJECTS?

3.1 FERROCEMENT; MAKING SMALL SCALE CHANGES

3.1.1 INTRODUCTION

The three live projects which form Part 1 of Chapter 3 form the primary empirical research-by-practice in Savda Ghevra. The three projects are:
(Chapter 3.1) small scale ferrocement objects
(Chapter 3.2) a housing project
(Chapter 3.3) a neighbourhood sanitation infrastructure project.

The projects question the nature of incrementalism and the opportunities for sharing, at different scales, in the context of a peri-urban resettlement colony. Opening with the smallest scale this live project is centred on small-scale additions to the fabric of the house. The following images show typical construction activity that is currently not shared, but represents an opportunity for collaboration in the form of small-scale improvements to the home and/or built environment.

Image 3.1.1 BATHING BAMBOO ENCLOSURE. Most houses are too small to contain and deal with any form of washing space within the house. As a result many families build small shelters over drains or in the surrounding fields which are used as washing spaces. The structures are typically made from bamboo woven screens and raised on discarded / leftover concrete drainage u-sections.

Image 3.1.2 WASHING SCREED. Because most water based activities (washing, cooking, and cleaning) happen outside of the house with no formal water management, many households have laid down a concrete screed with a raised edge to control the flow of water to the place immediately in front of the house. Some of these screeds will drain into a small soak pit in the absence of mains piped drainage systems. Others collect grey water in pots so that they can discharge these into large surface water drains or in parks and other open spaces.

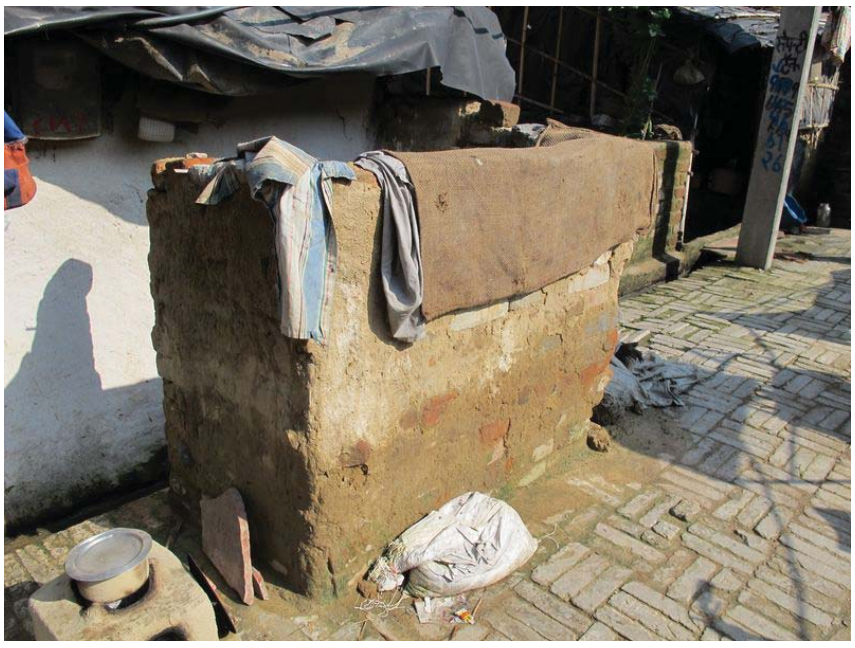


Image 3.1.3 ADOBE WASHING COOKING ENCLOSURE. Families often extend their house, described by authorities as 'encroachment', beyond the plot boundary. Performing a similar function to the bamboo enclosure this adobe wall serves as an outdoor washing and cooking space.

Image 3.1.4 BAMBOO STEPS. Rather than build a concrete staircase this family is using a bamboo step ladder to access the roof. Bima, who owns the house, described this as an incremental addition that will later become more 'permanent' when another floor is added which would ideally also have a toilet; whereupon they will get rid of the bamboo ladder and replace it with a set of reinforced concrete steps.

Image 3.1.5 OUTDOOR PLATFORMS. Many households have a raised platform outside the house which has many uses at different times of the day. During the day it is used by women to cook and clean, in the afternoon for children to play on and in the evening for men sit down, relax and play cards. Like most of these additions such platforms are technically encroaching on public land outside the plot. These platforms are theoretically illegal and if challenged, they can be removed without affecting the fabric of the house. Unlike the *otla*, a traditional architectural element that marks the transition from street to house, this platform is often set to the side and does not mark the passage into the home. However, like the *otla* these platforms, utilitarian in nature, also serve an important social function in Savda Ghevra where socialization takes place for a range of group activities.

Image 3.1.1-5 represent the type of small interventions that are happening all the time and which characterise one of the incremental changes that collectively define Savda Ghevra: continuous changes done by local builders and the residents themselves. The innovation in all of these 'objects' lies in how each one is an immediate response to the changing environment, skills and finances available – paradigmatic of the adaptive approach to the making and shaping of Savda Ghevra by the residents.

Could this approach of making small scale objects become a strategy to test out, and provoke a response from neighbours, the city authorities (such as the local officer from the Municipal Corporation of Delhi (MCD)) and the environment (physical and cultural) generally? The following live project uses the local production of three ferrocement objects to explore the hypothesis that sharing, by collaborative making, in support of incremental growth, can indeed get people involved and develop civic engagement and pride.

3.1.2 FERROCEMENT

Working in parallel to the other two live projects (Chapter 3.2 and 3.3) a series of design concerns had already emerged surrounding issues of water and sanitation arising from observations, interviews and community consultation. These issues were rainwater-harvesting, depleting groundwater levels and waste management. Thus exploring these questions became a natural starting point for this study. In addition, setting this research within the wider literature survey on making 1:1 objects (Mitchell 1998, 2003, 2010) and alternative material technologies (a term dominated by the research and publishing of the Intermediate Technology Development Group, e.g. Stulz 1988 and Watt 1978, 1984), ferrocement was chosen as the material to experiment with.

Ferrocement was first used to make boats by Lambot in 1847; better known is the work from the 1950s of the Italian Engineer, Pier Luigi Nervi, who made large span ferrocement structures, notably the roof for the 1950 Turin exhibition which had a free span of 91m[1]. Ferrocement is a cement[2]-rich matrix of sand and cement mortar (3:1) reinforced with layers of galvanized wire mesh. Unlike reinforced concrete which is reinforced as required based on calculated static theory, ferrocement gets it strength from its shape.

Ferrocement was chosen as the material to explore in Savda Ghevra because:
(1) Its basic raw materials are locally available.
(2) It can be fabricated into almost any shape to meet the demands of an existing and complex environment.
(3) It is more durable than wood/bamboo and cheaper than imported steel
(4) Skills are quickly acquired, if not already existing.
(5) It does not need heavy plant machinery or expensive, bespoke tools (see image 3.1.6).
(6) It is labour-intensive as opposed to being a machine or factory based system.
Its disadvantages are that cement uses a large amount of energy in production and produces carbon dioxide. There is further scope for research to look into the associated and comparative costs of ferrocement production.

Image 3.1.6 TOOLS REQUIRED FOR MAKING SMALL SCALE FERROCEMENT TANKS. In no particular order the tools needed are a wire cutter to cut the mesh, small pliers to make wire ties, and equipment for mixing cement: a measuring-cup, and plasterer's trowel.

3.1.3 MAKING AND PROVOKING: RESISTANCE AND ACCOMMODATION

This live project presents a hands-on cyclic process of experimentation and modification that took place over three workshops; two at the Centre for Alternative Technology (CAT), Wales and one in Savda Ghevra, India.

3.1.3.1 Cycle 1: July 2011; CAT, Wales

The starting point was not a fixed idea of a final outcome but began with the intention to build something relevant to the other live projects out of ferrocement. Already researching decentralised sanitation systems (more in Chapter 3.3) I was interested in developing the idea of ferrocement septic tanks that could be shared, both in terms of construction and use, by a group of families in Savda Ghevra. Research began by looking at small scale ferrocement tanks suitable for 5-10 families (image 3.1.7).

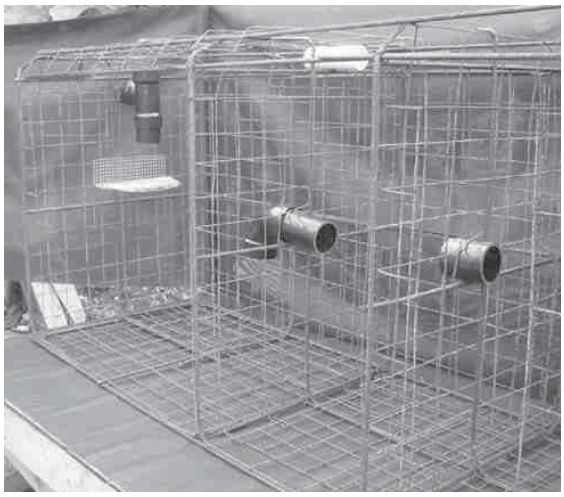


Image 3.1.7 THREE-CHAMBER SEPTIC TANK MESH FORM. This image shows the first layer of wire mesh defining three chambers complete with pipe work. Another layer of finer mesh would be placed on top onto which the mortar would be applied.

Source: http://www.ferrocement.com/casa-ca8/ch8.en-ferroHouse-web.html.

The first ferrocement object was made as an individual exploration, a way to experience the material and gain first-hand knowledge whilst participating on a course at CAT. Using drawings from Intermediate Technology Publications (Mara, 1996) as a guide (see figure 3.1.1) the intention was to build a septic tank.

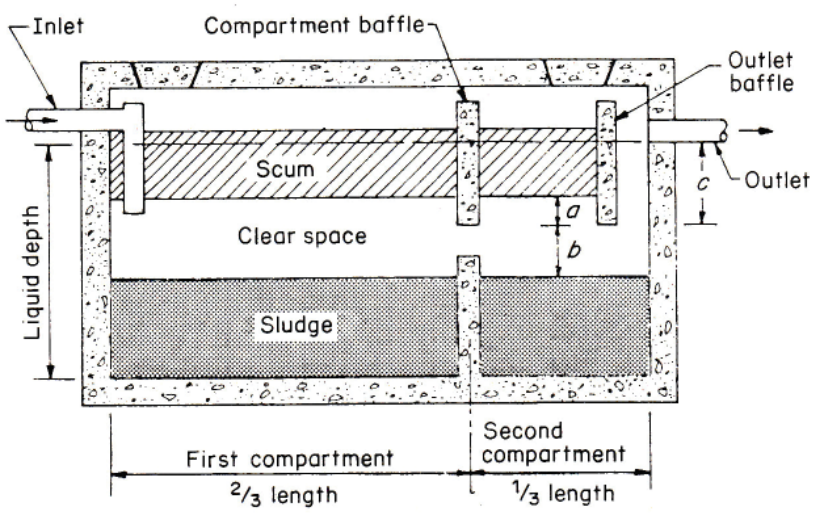


Figure 3.1.1. TWO-COMPARTMENT SEPTIC TANK. Septic tanks receiving sewage and perform treatment by a process of sedimentation allowing solids to settle and in time be partially digested. The still conditions of the tank allow for solids to sink forming a layer of 'sludge' and gases and lighter particles like oils and grease to float forming a layer of scum which effectively keeps the septic tank anaerobic (without oxygen).

The size of the tank was informed by figures (chart 3.1.1) provided by a waste management engineer in India, Mr. Zaidi (the engineer employed to detail the Sanitation Project, 3.3).

			Liquid Depth (m) based on maintenance	
Users (No.s)	Length (m)	Width (m)	2 years	3 years
5	1.5	0.75	1	1.05
10	2	0.9	1	1.4
15	2	0.9	1.3	2
20	2.3	1.1	1.3	1.8
50	5	2	1	1.24
100	7.5	2.65	1	1.24
150	10	3	1	1.24
200	12	3.3	1	1.24
300	15	4	1	1.24

Chart 3.1.1 SEPTIC TANK SIZE GUIDELINES. Septic tank sizes from the Indian code of practice which served as a guide for developing ideas for decentralized sanitation solutions.

What was actually built was one chamber with an inlet and an outlet (image 3.1.8). The outcome was predominantly determined by physical resistances. I had to build and handle the tank by myself with the limitations of workbench space, there was limited time and I lacked any formwork.

Image 3.1.8 FERROCEMENT TANK REPLICATING ONE CHAMBER OF A SEPTIC TANK. There were three critical physical resistances that resulted in the outcome. (1) Because of limited time – I had three days to make the tank – the scope of work was simplified in order to ensure completion. (2) Because this was an individual effort I had to limit the size of the tank to something I could handle by myself; the depth of the tank was limited to the length of my arm. (3) The last and final resistance was the lack of any formwork but the alternative of a readily available and abundant amount of fencing wire which could be easily bent into a cylindrical shape.

The size of the object was accommodated to the limitations of time and what I could handle physically. The way the tank was built, without any formwork, determined the shape because of the ability of ferrocement to be formed into any shape. In addition, the lack of any formwork highlighted how useful ferrocement could be for high density poor urban areas where space is limited and irregular. However, it was difficult to detail the tank to a specific volume and size. Similarly, the form of the inlet and outlet was determined by the form of the available discarded tin cans which in practice could cause difficulty connecting to a standard pipe.

3.1.3.2 Cycle 2: May 2012; Savda Ghevra, Delhi, India

Following the first cycle of this making project I was interested in developing basic and cheap construction techniques to build more accurate ferrocement tanks using formwork. In addition, and as a response to the first cycle, I was hoping that formwork would reduce the time it took to make the tank and make it easier to fabricate, as well as to replicate, since recycling the basic formwork could be made possible by sizing to the typical needs of a single family. During this period I was conducting field interviews with builders and contractors in Savda Ghevra. Facilitated by Centre for Urban and Regional Excellence (CURE), some of the builders were part of a programme CURE had set up to train and certify masons (image 3.1.8). Part of a government initiative aimed at empowering daily wage labourers. CURE were running workshops on brickwork which were attracting groups of up to 20 masons, including women. A video of the making of the first cycle ferrocement tank was shown to CURE and a local contractor. This was received with such enthusiasm that it was decided, on the back of the existing workshops, to run a training session introducing ferrocement to a group of masons in Savda Ghevra.

Image 3.1.8
CONSTRUCTION TRAINING CERTIFICATE. Daily wage workers have little leverage in terms of negotiating with a contractor a fee for their work. The idea behind the certificate is to provide a government issued document that vouches for a basic standard in skills. The hope is that this can provide leverage to not only get work but to be paid appropriately. In the absence of unions this is the type of alternative that is being tested.

Because the second cycle making project was to take place in Savda Ghevra, I wanted the making to have a discernible and practical outcome. In consultation with CURE's field team (see figure 2.1, Chapter 2 for CURE's management structure) it was decided that the intention of the workshop would be to build a ferrocement rainwater harvesting tank using formwork (like that in image 3.1.9). Inspiration came from a video produced by Ausgehend von den Konzepten und Technologien (EMAS), a German non-governmental organization (NGO) working on water

projects in Bolivia (EMAS, 2010) which shows how to make small (50-100 litre) ferrocement water tanks using a bag filled with sand as form work. Discussing how to run the workshop we decided to focus on water tanks because there is no piped water, and rainwater harvesting tanks could be a simple addition to existing homes.

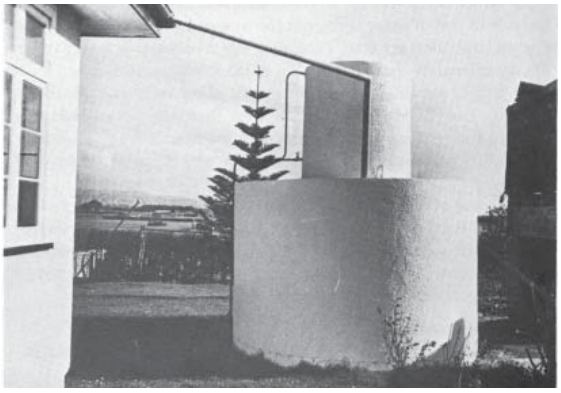


Image 3.1.9.
FERROCEMENT RAINWATER HARVESTING TANK. This simple cylindrical tank receives water from the roof diverted by a simple connection extending the gutter.

The outcome of this second cycle workshop was the production of a small scale rainwater harvesting tank (image 3.1.10). Although the making of the second tank took place in Savda Ghevra, a rich and complex cultural environment very different to CAT, the principal resistances that determined the outcome were also physical. The shape and size was determined by the formwork available - standard hessian sacks used to transport cement - and limited time as we only had one afternoon with the masons to run the workshop.

Image 3.1.10
FERROCEMENT RAINWATER HARVESTING TANK**.**
The workshop was run over the course of one afternoon which limited the scope of what could be built, ultimately limiting the size of the tank. Unlike the first cycle, this tank used a formwork: readily available hessian sacks used to transport cement. This principally determined the size and shape of the tank: the sack was filled with sand and then the wire mesh and mortar were formed around the shape. Once the mortar had set, the sand was removed through the top leaving a thin shelled jar. For the inlet and outlet small plastic pipes were inserted and cast into the tank, allowing for simple additions such as a nozzle to be affixed later.

Although the object accommodated similar physical resistances (shape, size as a response to limited time, and the type of formwork available) the process of making was deeply informed and directed by cultural sensitivities:

(1) Rather than have the NGO CURE or myself 'run' the workshop we sat down with two local contractors, Gajender and Naan ji Bhai; and, using mostly videos on-line, including the video of the first cycle CAT workshop[3], they became familiar with and confident about the process. This accelerated knowledge-transfer and allowed for local people to direct the outcome of the workshop.

(2) There is little public space that can function as a suitable venue to run a 'making' workshop. To run their accrediting and training workshops CURE were collaborating with a local 'holy' man, Satpal Chaudhry, who had set up a place of worship on what was an empty plot of land. A simple open structure set within an enclosed area in what is earmarked, according the MCD plan, as a park is actually now a temple with a small space out front which was used for the workshop. The outcome was that the 'making' took place on a very public stage within one of the few functioning public places.

(3) Running the workshop as a public event disseminated to an audience beyond the immediate participants how making ferrocement water tanks could contribute to the local economy and enrich and shape the local environment. This was celebrated and encouraged by ending the day with drinks and snacks - an opportunity for the wider community to come together around the creation of the ferrocement object.

(4) The intention for the tank to be used for rainwater harvesting was supported by the participants. However, during the course of the afternoon it became apparent that the masons thought that a ferrocement tank would be more useful as a water storage tank - as it would keep the water colder than the customary plastic tanks. After the workshop many ferrocement water storage tanks were built (image 3.1.11) but there was no take-up on the idea of making household ferrocement rainwater harvesting tanks. It is unclear why this increment to house-building did not happen.

The effect of the second 'making' cycle outlived the workshop: In the following months many more ferrocement tanks were made (images 3.1.11 and 12) for personal use and sold to residents. The surfaces of many of these tanks were decorated with patterns and even words. These tanks are used for storing and collecting water.

Image 3.1.11 LOCAL FERROCEMENT TANKS. The local production of ferrocement tanks in Savda Ghevra post the workshop.

Image 3.1.12 DETAIL OF FERROCEMENT TANKS DECORATION. The locally produced tanks were decorated with original motifs.

Four of the participants of the workshop - Kamlesh, Monish, Raj, and Veejender - are also involved in solid waste collection and composting, a business supported by CURE which takes green waste from homes and transforms it into high quality soil. Having secured a remote park space from the MCD for composting and having asked CURE for some assistance, they have gone on to build a large rainwater harvesting and groundwater recharging system (image 3.1.13). Both these initiatives show the extent to which the one workshop has effectively disseminated its message to become a precedent for small incremental shared changes in Savda Ghevra.

Image 3.1.13 SELF INITIATED FERROCEMENT PROJECT. Rainwater harvesting and groundwater recharging.

3.1.3.3 Cycle 3: July 2012; CAT, Wales

The location of the third cycle ferrocement making project was back at CAT. This time the intention was to increase control of the shape of the tank using fabric formwork, seeking to explore and extend its successful use in Savda Ghevra. In addition, as a cost-saving measure to make the process relevant to a place like Savda Ghevra, the intention was to make the object with a re-usable mould. Having explored the making of septic, and rainwater-harvesting tanks this third cycle aimed to investigate the cost-effective construction, in ferrocement, of innovative wastewater treatment arrangements, with an emphasis on retrofitting. The aim was to test the relevance of ferrocement in the making of bio-gas harvesting tanks, inspired by designs developed by the Water Supply and Sanitation Collaborative Council (WASH), a global organisation that focuses on sanitation and water for the poor (figure 3.1.3). These designs would be suitable for up to eight families with livestock (such as pigs). The families would share the construction, maintenance and bio-gas generated.

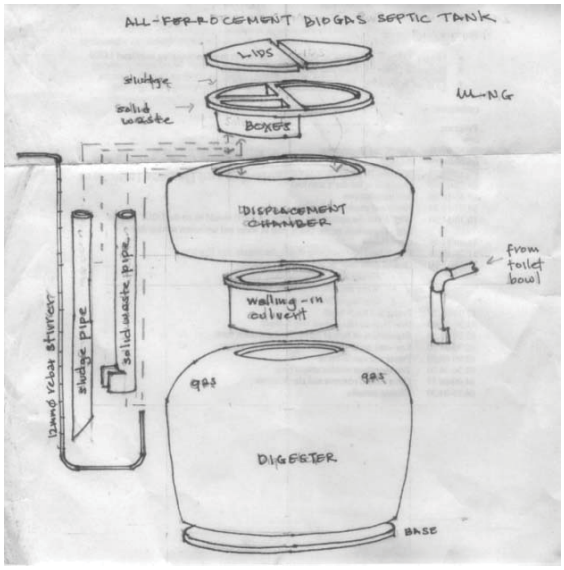


Figure 3.1.3 DESIGN FOR AN ALL-FERROCEMENT BIO-DIGESTER. To generate biogas the tank must be designed to specific volumes based on an approximation of the amount of waste placed into the tank. The design has two chambers: the displacement chamber (1.2m^3) and the digester / gas collector (3m^3). The chambers are made by welding steel rods into panels which form moulds which are then clad in a wire mesh and wrapped in a polyester curtain cloth. A cement base is made separately and the moulds are placed on top where they get coated with mortar, wire reinforcement and another layer of mortar. Once set the moulds are removed and can be re-used.

Source: http://www.wsscc.org/sites/default/files/ferrocement_biogas_digester.pdf.

Again, because of time restrictions, and because I was building the tank by myself, what was made comprised a single chamber composed of a demountable and reusable formwork (image 3.1.14), resulting in one tank, scaled down in size (image 3.1.15).

Image 3.1.14 FERROCEMENT FORMWORK. The formwork is composed of a series of ribs which interlock and can be removed once the ferrocement has set.

Image 3.1.15
FERROCEMENT TANK MADE WITH A RE-USABLE MOULD. The resistances that defined the outcome where similar to the first tank: (1) Because of space, time and physical limitations the object is a scaled version of a working design for one chamber. (2) The key resistances were in delivering on the intention to create a re-usable formwork. Unlike the WASH tank it was very hard to curve rods into such a small diameter. Rather than create a series of removable panels like the WASH design I settled on creating a series of wooden ridges onto which a hessian layer could be affixed. The ridges and the hessian would come apart once the mortar had dried.

The design had to be adjusted significantly for the mould to be re-usable: this limited the curvature of the ribs that defined the shape, because they needed to be removed once the object set. This meant that the curve of the ridge could not exceed the diameter of the opening. In addition, rather than wrap the whole object with a hessian sack a technique was developed whereby the sack was cut into segments which would make it easier to release. However, it was hard to match the hessian shapes with the formwork ribs. These problems thus formed the basis for a proposal and grounds for further research by which women in Savda Ghevra could cut the fabric with sleeves into which the ribs could be set, making the process of assembling the mould easier. Figure 3.1.4 shows the whole process for all three cycles simultaneously.

Figure 3.1.4 [next page]
ALL THREE CYCLES. Making the ferrocement objects showing the difference along side eachother.

(1) Formwork

(2) Surface Build-Up

EXPERIMENTAL
Cycle 1: July 2011; CAT, Wales

Create form by bending stiffer steel members. The technical requires no formwork.

Using wire to hold the form together before laying chicken wire across the whole surface.

In and around the stiffer members and the chicken wire additional forms can easily be made such as this outlet using discarded tin cans.

The chicken wire is placed so that the two surfaces overlap. The cement is applied to create the cement rich surface.

Continue forming cement surface and making it smooth.

MASS PRODUCTION
Cycle 2: May 2012; Savda Ghevra, Delhi

The formwork is created out of filling a polyurethane bag with sand (a waste product from nearby construction sites).

A web of rigged members and thinner wire is used instead of chicken wire. This is tied around the bag taking the shape of the filled bag.

The cement mix is applied over the surface of the bag.

The thinner wire members are wrapped around the surface leaving a thin layer of cement between the wire and the bag.

Another thin layer of cement rich mix is plastered on top of the wires leaving a smooth surface.

EXPERIMENTAL
Cycle 3: July 2012; CAT, Wales

The formwork for this tank was made out of wooden ribs.

The ribs, which come apart so that they can be re-used, are assembled.

Once the formwork is assembled it is placed on a base with chicken wire.

The form is covered with hessian sacks.

In combination with chicken wire and cement over the surface is made.

3.1.4 CONCLUSION

The process of 'making' generated a series of responses, both in terms of what is possible with a material, and how a site can inform not only the use of an object, but how it is made, built and perceived. Sandwiching two individual explorations in Wales with one, on site in India, refined and informed the off-site experience. Away from the complexities of the site, a more technical response emerged. The fact that the workshop participants in Savda Ghevra went on to build with ferrocement offered continuity in a process which is still going on: it is a shared experience which is shaping incremental change in that community.

The act of making on-site not only triggered innovation and change but provided a way of working, and collaborating, within the community. The workshop was one of the only days I hardly needed a translator; 'making by doing' overrode the need for words. Following the workshop, local contractors and masons knew who I was, and it became easier to interview and test ideas in conversation with them. Many of the participants have also become aware of other projects – the sanitation and core house - and have become advocates for some of the ideas being explored during community consultation in other parts of Savda Ghevra.

The cyclical making process also generated reflections about all the projects. Originally experiments in ferrocement were aimed at addressing street-scale sanitation (which will be discussed in Chapter 3.3) but as that project developed, and the scale of the project changed, those experiments in ferrocement generated an interest, a search even, for other applications and uses. Refocusing, away from a fixed set idea meant that this research, rooted in small-scale interventions, explored more than septic tanks; the end result was unexpected, indeed, it was an open-ended - end result.

What was learnt was a way of working that is itself incremental. It allows for a better communication across language barriers, it allows for a 'nudge' process of change, by promoting sharing and exchange. The scale of the technology obviously has a physical dimension – but it has a has a cultural one as well.

3.2 CORE HOUSE

3.2.1 INTRODUCTION

An early observation made during fieldwork was that there were tiny gaps between houses (image 3.2.1). What these gaps highlighted was that not one house in Savda Ghevra 'shared' any aspect of their, albeit new, housing stock. This Chapter tests the hypothesis that shared incremental growth can generate and support the housing economy.

Image 3.2.1 DETACHED HOUSING. This image clearly shows the very small gaps between houses.

This qustion immediately threw up questions such as, could party walls be a way of building cheaper homes? If separated walls would be shared then approximately 10% more floor area would be available. What kind of scope for collaboration would result in a residents making investments in their homes? The reality for most residents in Savda Ghevra is that they are living in more cramped conditions than the slums from which they came. In the case of Vanadana, a 19-year-old girl, this has meant that while she previously had her own room and had aspirations to become a lawyer, resettlement to Savda Ghevra, from an inner city slum, has resulted in no space to study and a think of the opportunities life has to offer. Aside from the lack of space, the housing stock is also blighted due to poor construction and material availability. The external fabric often lets in rainwater and in some extreme cases collapses.

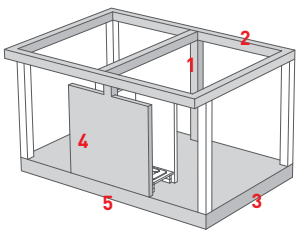
The Core House Project proposed a framework for incremental additions which would support permanence and better living arrangements but also better anticipate the addition of new storeys. This required an exploration of new types of sharing possible, testing the hypothesis that encouraging sharing and incrementalism would result in increased freedoms and support the development of 'town' and civic culture.

3.2.2 THE HOUSE AS AN IDEA OF TOWN

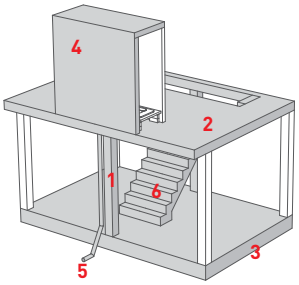
The Core House Project began by identifying five opportunities for sharing at a household and street scale: party walls, staircases, superstructure (columns), water collection and sanitation aspects such as pipe work, toilet construction, and household chambers (that connect to the manhole). With these 'variables', a process of design and consultation was undertaken to see how, if at all, there was scope to test these opportunities against these hypotheses.

The process began by discussing with local contractors (builders) and the residents of Savda Ghevra the available scope for introducing the identified 'shared' opportunities. The problem with sharing that emerged from interviews was that the houses grew at different rates (as families separately invested in their plots) which required independence from each other. Another aspect came from conversations with designers and CURE employees which revealed the aspirational or notional aspect of homeownership rooted in being able to clearly distinguish "what's yours".

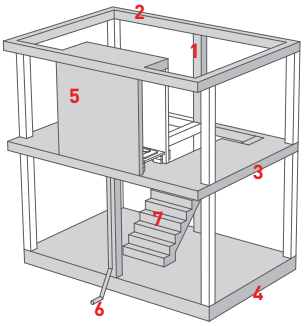
NGO workers described the process of demolition and resettlement as an extremely violent event, resulting in a heightened sense of insecurity and a need to clearly define one's own space in the trade-off from inner-city slum life to peripheral home-owning life. Reacting to this, the first design was developed to test sharing at a household-to-household level (figure 3.2.1).



CORE HOUSE (A)
BASIC SINGLE STOREY



CORE HOUSE (B)
BASIC UPGRADE



CORE HOUSE (C)
FULL UPGRADE

shared:
1 columns
2 2nd floor upgrade frame
3 1st floor
4 foundation
5 toilet superstructure
6 toilet outlet
7 stairs

Figure 3.2.1 SHARED SUPERSTRUCTURE. Sharing the superstructure made possible other forms of sharing such as staircases and the infrastructure supporting household toilets.

For the 'Core House'[1] housing model, it was proposed that instead of shared party walls (the terrace housing model) an armature – concrete frame – would be shared that would allow for independent adaptation and growth. Walls and roofs could be in-filled (figure 3.2.2) to each family's specification, and completely independent from each other, whilst saving costs by sharing the frame. Initial responses from open consultations and discussions with contractors were positive for this proposal.

Figure 3.2.2 CORE HOUSE STRATEGY. The Core House offered a universal and basic foundation by providing an engineered frame capable of cheaper and incremental infill options. Rather than make a series of separate dead-end investments into an individual house type, the idea was to deliver a frame which from the outset, had the potential to support a three-storey house through small improvements.

The opportunity to test this idea came about when the Sir Dorabji Tata Trust (SDTT)[2] released funds in mid-2011 to install a second Water Kiosk to CURE. The first Water Kiosk (described in chapter 3.4), also funded by SDTT, is a business that sells water. It functions as an infrastructural hub catering for a growing neighbourhood and increasing demand for water. Operating as a consultant to CURE, I proposed that the second kiosk could be used as a vehicle for testing a shared housing model, in addition to the water business where one or more plots could be developed together. The initial proposal for a Core House was arranged across two plots (figure 3.2.3) that shared a superstructure, staircases at ground level and toilet infrastructure. The ground level served as a shared room, open to the public and housing the business whilst allowing for the subsequent levels to be partitioned according to each household.

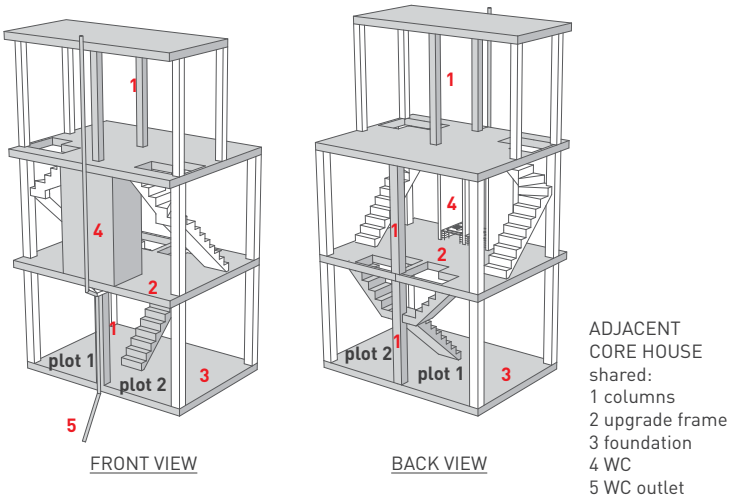
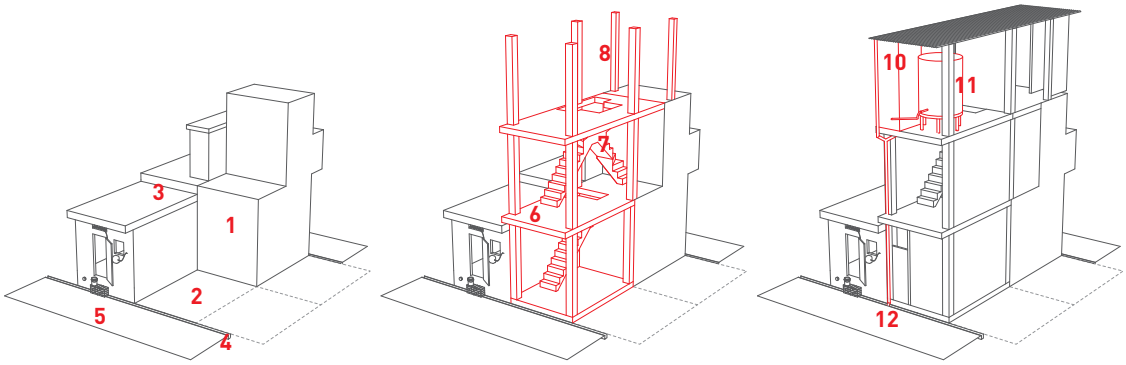


Figure 3.2.3. FIRST DESIGN: PROPOSAL FOR TWO HOUSES SHARING FRAME. Sharing of columns also allowed for shared infrastructure for the toilet: specifically the soil pipe and any infrastructure required to connect into a sewage network such as a household chamber or manhole.

CURE began looking for neighbouring families interested in the shared water kiosk business. The process began by looking for two families in 'A' Block, living in substandard *kuccha* (a term, along with *pucca* and semi-*pucca*, explored further in Chapter 3.5) housing as an opportunity to test the Core House model as a viable strategy for the poorest families in Savda Ghevra. There were only a limited number of *kuccha* houses side-by-side or back-to-back. But only one set of families showed any interest; however one was Muslim and the other Hindu and they felt uneasy about sharing both the superstructure and water kiosk business on religious and cultural grounds.

CURE therefore decided to work with relatives who owned two plots back to back and were willing to share. Figure 3.2.4 shows this relationship: Plot 1 (no. 209) already a 1.5 storey *pucca* house belonging to Mrs. Girja Devi, the wife of Mr. Surender Singh. Their son, Mithlesh, owns Plot 2 (no. 212) into which he is moving now that he is married and his wife Veenita has migrated from their[3] village in Uttar Pradesh to Delhi. Mithlesh's plot was occupied by a *kuccha* house which he did not live in[4]. The Core House design included the full construction of the concrete frame in Plot 2 (demolishing the *kuccha* house) and extending over and on top of the existing *pucca* house in Plot 1.



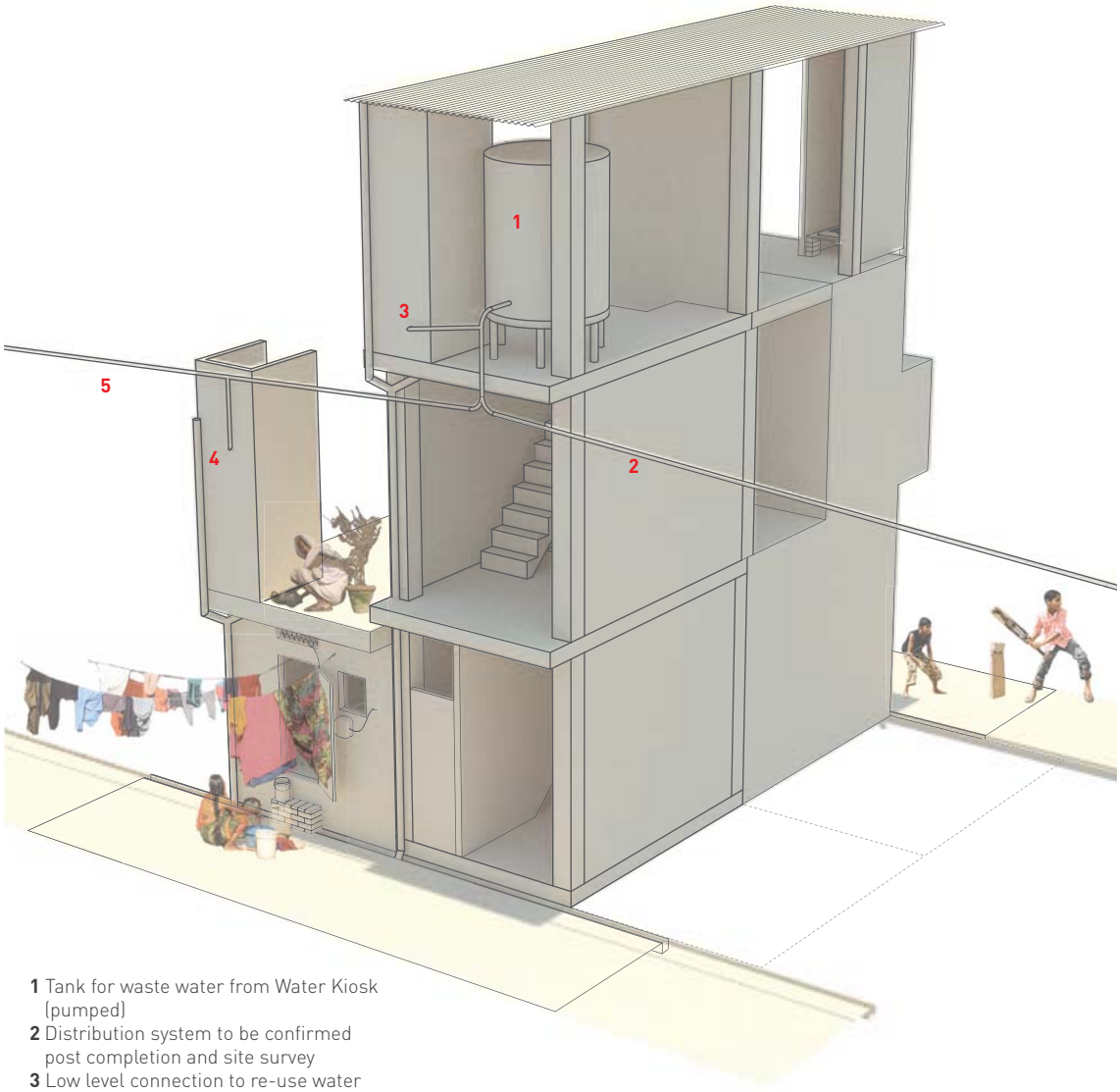
1 Plot no. 209, pucca house
2 Plot no. 212, empty
3 Adjacent developed plots
4 Existing Drain
5 Lane

6 Core House upgrade (plot no. 212)
7 Shared staircase
8 Partial upgrade (plot no. 209)

10 New toilet
11 Water Tank to flush toilets
12 Waste connection to sewage

Figure 3.2.4 SECOND DESIGN: CORE HOUSE BUILD PROPOSAL.

The second Core House design was, in addition to the concept of a shared frame, concerned with how to deal with re-using water associated with the Water Kiosk business. The Kiosk pumps polluted ground water which is transformed into drinking water through a mechanised filtration process called reverse osmosis (RO). Rather than pump the water to the ground floor, like the first Kiosk (Chapter 3.4), it was proposed that the second Kiosk pump the water to the first or second floor so that it could then be piped (distributed by gravity) to houses in the area. The distributed water could be charged out with a standard connection fee and household use metered (figure 3.2.5). The building works required could be part of an upgrading or retrofitting process. The kiosk business, unlike the first, operates out of the second floor because it runs on a door-to-door delivery system freeing the first floor for additional income generating activities.



1 Tank for waste water from Water Kiosk (pumped)
2 Distribution system to be confirmed post completion and site survey
3 Low level connection to re-use water for flushing toilet
4 High level connection for flushing toilet
5 Distribution to rest of lane

Figure 3.2.5 CORE HOUSE BUILD AND SPECULATION.

However, the filtration process produces large amounts of waste water (odourless but not drinkable) when the filters are backwashed. In the first Kiosk this water was mostly thrown away but sometimes diverted informally to construction sites. Because water is such a valuable and scarce commodity the ambition for the second kiosk was to design into the proposal a way to actively re-use this water. In line with the parallel sanitation project which is delivering infrastructure to support in-house toilets to 'A' Block the design proposed ways to connect the odourless waste water with local toilet cisterns for flushing. Furthermore, recognising that currently the first kiosk operates by pumping water from the ground with no requirement to replenish this source, the second kiosk is installing a rainwater harvesting system on the roof connected to a recharge well.

In parallel a 'water committee' was established to ensure that the water remained affordable and to exert influence to ensure that the kiosk continued to operate and serve the community. The committee acts very much like a regulatory body, formalised as the *Shudh Jal Ghar Samiti*

(Pure Water House Committee) which currently has 15 members. To support this a secretary was appointed who is receiving training from the local NGO, CURE, including assistance in duties such as setting up, and administering, a bank account.

In terms of construction, the cost benefit of the Core House model (chart 3.2.1) could be tested with this live project. Chart 3.2.1 shows a cost breakdown for the construction of the two houses which together had a total cost of 32,3175 Indian Rupee (INR). As a reminder this figure covers the construction of a completely new two-storey structure on one plot and the addition of one storey on to the existing house on the neighbouring plot. Sharing columns and the subsequent reduction in required materials meant that we were able to build one and half two-storey houses for 32,000 INR when a standard two-storey house normally costs 35,000 to 40,000 INR, a huge saving for both families.

Tentative Budget for Core Housing Structure- SG					
SN	Particular	Time/Measurement	Unit	UMO	Unit cost
A	Material Cost	Budget allocated			
1	Brick (A class quality)	one time/per piece	12000	3.35	40200
2	Cement (ACC 53 Grade, Rust Proof)	One time/per bag	165	300	49500
3	Badarpur (A class)	One time/ per fit	775	35	27125
4	Sand	One time/ per fit	225	20	4500
5	Steel rod (12 mm rust proof)	One time/per KG	1440	55	79200
6	Concrete (different size)	One time/ per fit	525	35	18375
7	Water	Lump sum	1	7000	7000
8	Other material (Wire, rope, water tank, cutter, platform for frame, shuttering material, polythin,hooks, electricity pipe, iron box, broom, tape, drain pipe, net for sand filter,Platic mug, plash, plastic pipe for water, hammer, iron brush, iron plate, spade,nylone net,pannier,toilet seat etc.)	Lump sum	1	37000	37000
9	Safety material (Gulps, Cap, Mask, shoes etc.)	Lump sum	1	5000	5000
10	Equipment (Mixer+ petorl+Climber etc.)	Lump sum	1	15000	15000
	Total				282900
B	Labour Cost				
1	4 full time labour	Per day	40	250	10000
2	2 trained Mason	Per day	40	400	16000
	Total				26000
	Grand Total (A+B)				308900
Note: Electricity fitting, doors, railing, electricity connection, water tank charges not included in core house structure cost.					

Chart 3.2.1 CORE HOUSE BUDGET.

3.2.3 BUILDING AS A VEHICLE FOR SHARING AND THE CHALLENGE OF INCREMENTALISM

Construction of the Core House began in September 2012 and was completed in August 2013. The process began with a *puja* (or *Pooja*) ceremony, a hindu religious ritual (image 3.2.2). There are many variations and scales of this ritual, ranging from personal daily practice to large ceremonies at the local temple involving offerings and prayer. Typically all construction work begins with a *puja* led by the local craftsman, principal contractor and the local religious leader. The *puja* ritualises the act of laying the first foundation stone, in this case the brick pier foundations, and is meant to be an omen of good times for the house and its residents. A red string, part of all *puja* ceremonies, is tied around the first bricks, the tools of the master carpenter and mason and, after the ceremony, around the wrists of all the people in attendance.

The *puja* was an opportunity for the Singh family, but also a wider audience (friends, neighbours and interested parties through word of mouth), to come together around the project; an opportunity to share ideas, aspirations and hopes. Image 3.2.3 shows the family from the first water kiosk joining Girja (second left), Surender (second right), Mithlesh (seated, bottom left hand corner) and Veenita (third right) celebrating laying the first brick. The very public nature of the *puja* and the general attraction of the project, with myself a foreign guest, ensured that the Core House entered into the collective consciousness of 'A' Block and Savda Ghevra in general. The result has been that the process of building has been a public affair, an *in-situ* housing exhibition, bringing people from the community to discuss the merits and demerits of the design.

Image 3.2.2 *PUJA* CEREMONY FOR THE CORE HOUSE BUILD. The master carpenter for the house (right) is laying the first bricks with Mithlesh (right) sat with garlands to mark the occasion.

Image 3.2.3 MEMBERS OF THE COMMUNITY HANDLING THE FIRST BRICK. The holy man brought in for the ceremony can be seen collecting the first bricks which will be laid by the master carpenter.

The intention of the Core House was to build something that was within the construction know-how of the local contractors. However, during construction the concept of a reinforced concrete frame supporting a multi-storey structure, without the use of load-bearing brick walls, was not understood. The experience taught us that reinforced concrete construction, unlike traditional construction, requires a degree of static engineering knowledge. The sizing and making of reinforced concrete frames is beyond the current capacity of the local building workers in Savda Ghevra perhaps because the way that reinforced concrete carries load is not intuitive.

The consequence of this unfolded during construction of the reinforced concrete frame. The foundations, according to the contractor, could not support the load of the proposed two-three storey structure. This resulted from miscommunication between the original contractor, and the second contractor who inherited the job at the last minute. A long conversation ensued between the principal contractor, other random contractors who were 'loitering', materials suppliers and myself, playing the role of consultant as an architectural designer.
A series of issues were debated:
(1) that the frame was not strong enough, as a frame, to support the full load of the structure given the foundations;
(2) that reinforcement bars were needed but, because there are only two kinds available at the local material distributor, using a thicker bar would be very expensive;
(3) that it would be cheaper to in-fill the structure with a load-bearing brick wall.

The debate was convoluted and confused, both technically, and in terms of what the aim of the project was. It came to a point where it was proposed that, if I thought the reinforcement they had would be enough, then they would continue on that basis. Given my role as principally that of a researcher – although I had designed the structure - I had to bow out at this stage of the conversation, and insist that the contractor work to his standard and his satisfaction. The result was that the Core House, even at a very early stage, resembled, and was built like, a typical *pucca* house (despite the shared columns). Image 3.2.5 and 6 show the last photographs of the Core House almost complete taken in April 2013. Aside from the issue concerning the load-bearing capacity of the frame, it was hard to test ideas for alternative in-fills as the client (the Singh family), had a strong sense that they wanted a house very much based on a standard set locally, and inherited culturally. The idea of in-filling with unknown materials such as rammed earth seemed 'cheap' to them; and, given that they could afford to in-fill the whole structure with brick (because of the loan offered from CURE at 0% interest), there remained little scope to experiment.

Image 3.2.5 VIEW OF CORE HOUSE.

Image 3.2.6 INTERIOR SHOT OF CORE HOUSE. This is a photograph of the first floor (ground plus one) which will house the water treatment plant. The room has been tiled to not only keep the room clean (important both practically and in terms of public image) but also to have a surface which can manage water spillage. Tiling is also perceived as the most premium finish for a house.

Although the idea to test sharing only found a 'client' within a family structure – acting more like a model suitable for the traditional Indian extended family to build as the family grew – rather than an idea suitable for neighbourly sharing, the event has triggered some sharing. The next-door neighbours have agreed that the construction of their roof can be used as part of a shared rainwater harvesting system. The water business is up and running and the ground floor has been converted into a hair salon (image 3.2.7).

Image 3.2.7 COMPLETE CORE HOUSE AND SALON AT GROUND LEVEL.

The very public process of building this house embedded the concept of the Core House in the collective imagination of local forms of construction. During consultation with families who needed to upgrade their homes as part of the sanitation project (Chapter 3.3) I was asked to consider designs for a *kuccha* upgrade. Again proposing a concrete frame plus toilet (see figure 3.2.6) the design was shown to about 16 representatives from 'A' block where the sanitation project was implemented. These residents understood the idea of a frame which didn't need load-bearing walls, as they had seen the Core House midway through construction. The idea was that such a frame could be suitable for upgrading houses for the poorer families with less ability to access or pay back credit because of the cost saving.

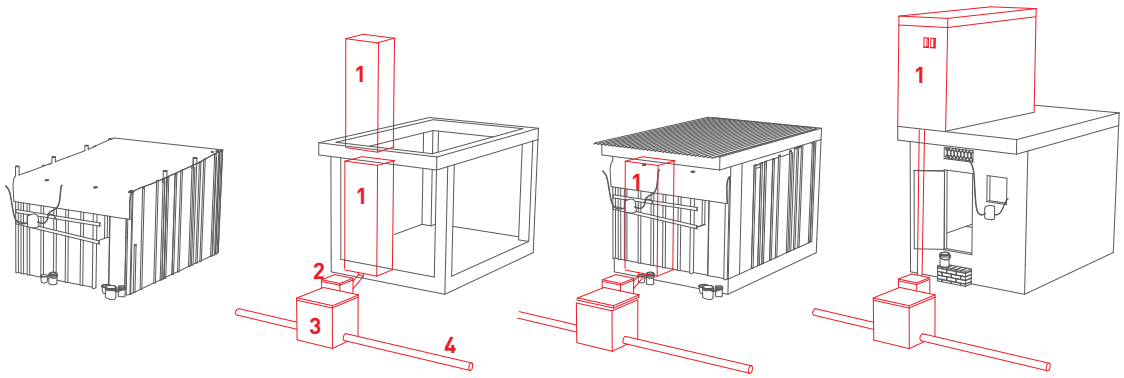


Figure 3.2.6 *KUCCHA* CORE HOUSE UPGRADE MODEL.

3.2.4 CONCLUSION

Although the Core House, at a construction level, didn't successfully test the full potential of sharing, the business model behind the delivery of water, in a marginal peripheral community, appears to be more promising. The Core House project addressed the question of how the sharing of city, market, and the community can sustain itself long-term, and the productive use of natural resources – in this case water – outside the customary frameworks of regulation or delivery of a 'service'. The design proposed a useful way of sharing the construction and benefits of proper use and distribution of water without a formal regulatory or institutional structure to support this sharing; aided by the emergence of the 'water committee'. However, in the absence of even the basic trust required to develop the conversion of infrastructural needs into institutional commitment, as will be seen with the sanitation project in Chapter 3.3, the design remains at best a potential catalyst for future discussion and collaboration.

The more sophisticated technical knowledge required for both the Core House and any alternative, off-grid, water-system, means that the scope of collaboration needs to incorporate the people with the requisite knowledge as co-stakeholders with carefully-defined legal responsibilities to which they are professionally accustomed, not simply as the people with the expert knowledge. The alternative to this is to convert the principles of new types of construction into safe rules-of-thumb. The Core House as a test bed for how 'town' building happens showed – notably in the *puja* ceremony – a moment of solidarity between residents; albeit limited in reach, as the *puja* ceremony failed to transcend religious divisions which, although not explicit, remain as important barriers to sharing. Expert knowledge and religion in this case are significant thresholds needing to be accommodated in the transition into 'town' with nascent civic institutions.

Five main issues arose from this live project:
(1) Sharing within extended domestic structures is possible whilst retaining individual identity.
(2) The water kiosk is a viable business which encourages housing investment and links housing credit to livelihood initiatives.
(3) The proposal for a shared physical structure bringing economic benefits leads to:
    (a) The question of technology and rules of thumb. And -
    (b) The issue of the individual versus the collective as a matter of designing and building a 'framework for top down provision'. In other words, to what extent does the procedure point to possible state, or other corporate provision, for framed-up (core, incremental, staged etc.) sites?
(4) The potential to develop rules of thumb for the incremental upgrading of homes, and the use of alternative materials to support this, including the creation of institutions (professionalisation) which remove the technical responsibility of house building from the families and individuals, to shared collective organisations.
(5) And finally, if top down intervention is considered then what prevents the frame from becoming a version of the homogeneous apartment blocks (the standard development pattern) which tends to assert the importance of the individual within the collective economy. In other words could the frame ultimately limit processes of collaboration and self-build as an opportunity for the creation of 'civic' culture?

Concluding figure 3.2.7 shows the full sequence from concept to build of the Core House highlighting key design components and how they shifted with each progressive change.

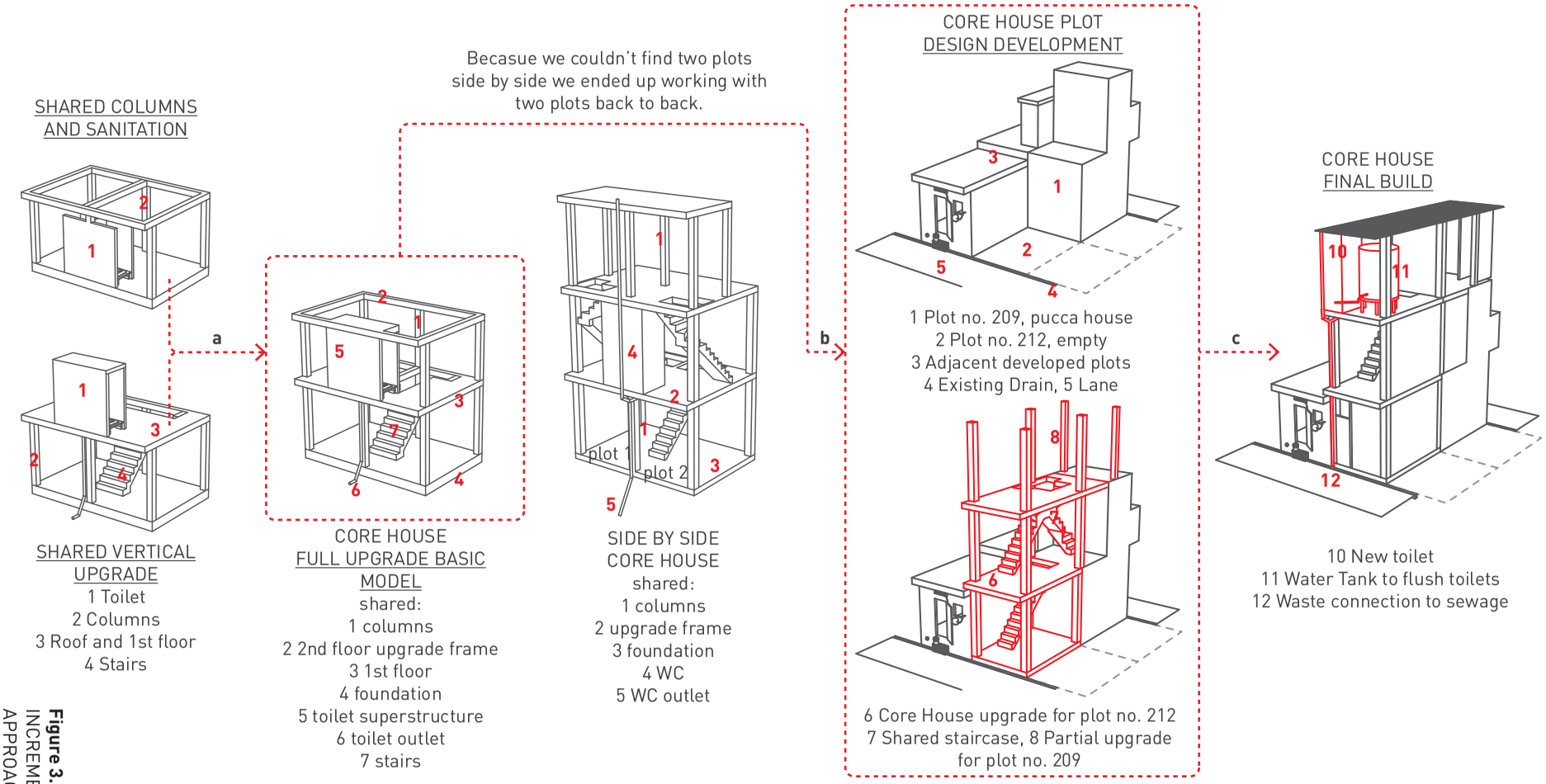


Figure 3.2.7 AN INCREMENTAL APPROACH TO HOUSING

3.3 SANITATION PROJECT: PIPE DREAMS

3.3.1 INTRODUCTION

At around one in the afternoon, one day in 2010, 35-year-old Savari Devi left her house in Savda Ghevra to defecate in a nearby field. She was then seized by three men, and dragged into some nearby bushes. But a young boy, seeing the abduction, ran for help. Savari was saved. Hers is an extreme case, but not an uncommon one: open defecation leaves women, particularly young girls, vulnerable to sexual harassment and abuse. The issue of open defecation due to inadequate sanitation is not just about the dangers, humiliation and indignity associated with the practice, but it is also a significant cost issue, due to associated health and loss of income. India loses approximately 5% of its GDP annually in health-related costs associated with inadequate sanitation and 20% of girls will not attend school because of a lack of sanitation facilities (World Health Organization, 2010). The lack of sanitation is emerging as one fo the most pervasive development challenges in India, compounded by rapid urbanisation and peri-urbanisation.

The planning of Savda Ghevra by the MCD included just nine community toilet complexes, which are insufficient to meet the growing population. Assuming that all the existing latrine seats in the complexes are usable, the ratio of seats to women inhabitants is 1:250 - well under any recommended level. During interviews many residents complained of the prohibitive costs of the few functioning complexes which are often in serious disrepair within months of being constructed, leaving people with little or no alternative but to defecate in the open. The space around the public toilets often becomes heavily used for open defecation which, in turn, produces a very large health burden and contributes to high infant and child mortality. Toilet blocks also become places where household wastes are dumped, since communities often have no garbage collection. All of this meant that when fieldwork began 88% of the population defecated in the open (CURE, 2010 p. 11). Women particularly suffer from having no accessible and safe toilet. To protect their modesty, they often wait until nightfall to defecate in the open; but this need to wait until dark also causes widespread gastric disorders. As such, those families who can invest in private sanitation solutions, do so.

One of the most common forms of individualised behaviour recorded during household surveys was the use of private tanks, linked with a toilet, in the house (see figure 3.3.1). Locally called ‘septic tanks’ – but actually a cesspool - these are brick and concrete-lined pits that collect effluent and flushed with water. A cesspool is a temporary container in which sewage and other refuse can be held till emptied. Because the contents are toxic, cesspool emptying must be carried out frequently to prevent any build-up of solid waste. This is done by a tanker that pumps the contents of the pit and disposes it. An average five-person household will spend 400 INR every two to three weeks getting the pit emptied –which represents 13% of the local average monthly income (CURE, 2010, p.6). Aside from the high running costs, these pits produce much of the unsanitary conditions of Savda Ghevra: their poor construction results in blackwater percolating into the ground and the informal dumping of waste collected from the individual pits percolates into the groundwater aquifer. Furthermore, these pits often overflow into open drains (image 3.3.1).

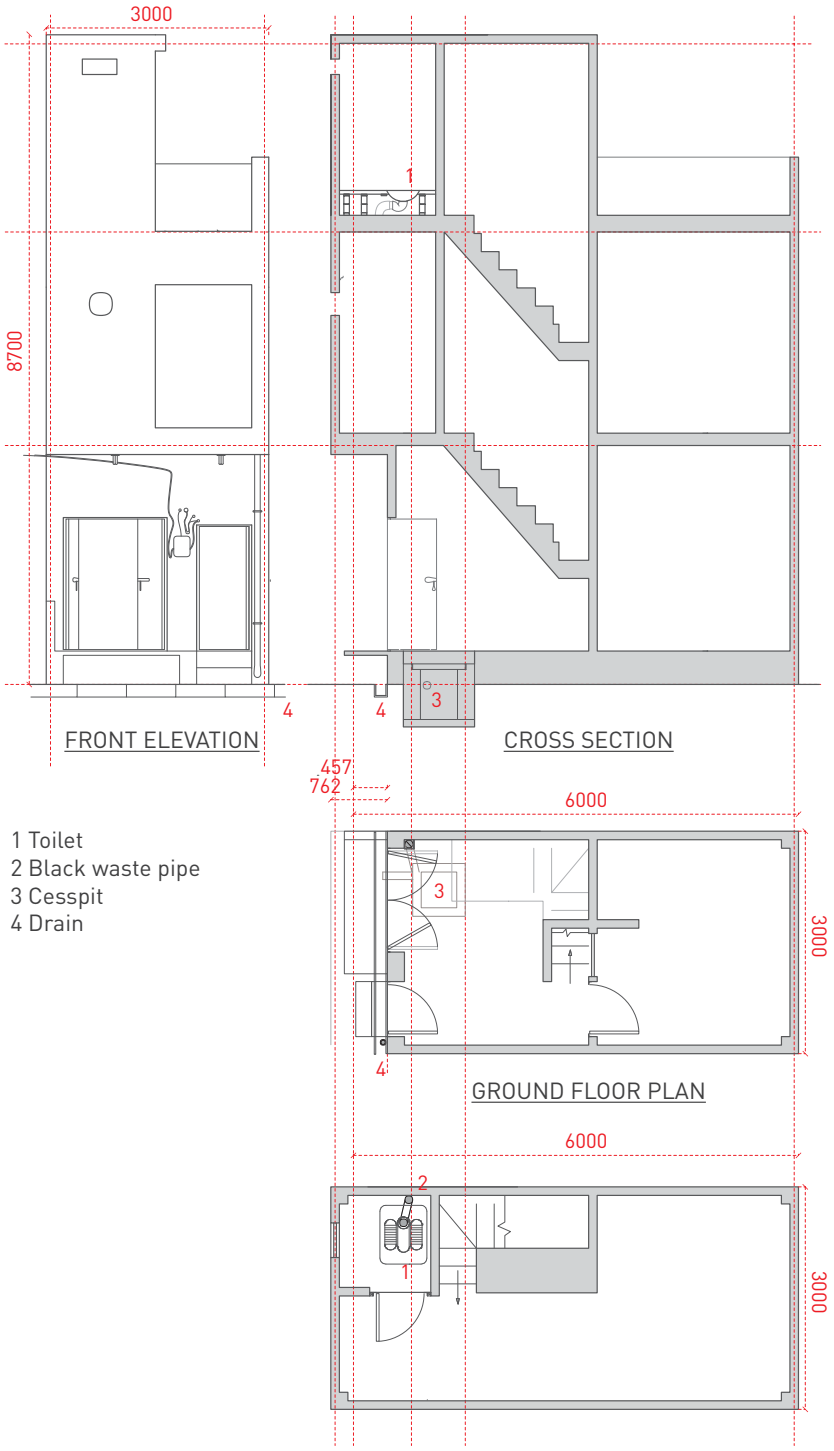


Figure 3.3.1 THE TYPICAL 'SEPTIC' TANK FOUND IN SAVDA GHEVRA. Most of the household toilets are serviced by tanks that collect the human waste are built in a very similar fashion. The brick concrete-lined pit / tank is constructed underneath the house approximately 1m by 2m in plan and 1m deep.

Image 3.3.1 TYPICAL OUTLET RELEASING EFFLUENT INTO OPEN DRAINS. The tanks often overflow into what are incomplete and blocked open drains intended to move greywater leaving exposed sewage to stagnate and percolate into the ground. Not all houses let their tanks overflow and will get the pits emptied by a local 'Septic Tank *Walla*' – a man who comes with a truck and mechanically removes the waste. However more often than not the septic tank *walla* will dump the collected waste not far from Savda Ghevra on unused land significantly contributing to groundwater pollution.

The Sanitation Project was built upon the proposition that, beyond the prohibitive expense, the individual practice of latrines connected to pits was causing a problem for everyone and that sanitation was central to achieving basic health, decorum and personal freedoms (Sen, 1999). The Sanitation Project explores the possibility of developing infrastructure – here, sanitation only – using techniques and procedures of the incremental housing economy. In particular, would it be possible to use incrementalism to develop a collective commitment to a common problem, beyond the level of the individual house?

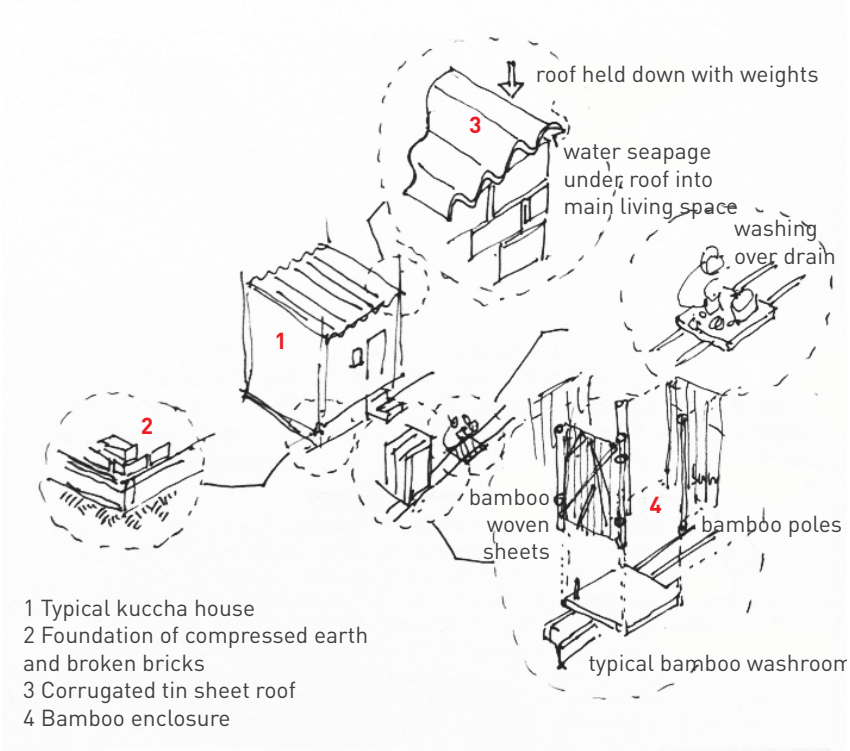
The following section outlines the most elaborate (and perhaps important) empirical work of the PhD. The live project is an interplay between three phenomena:
(1) The design, planning and installation of a sanitation system with its particular attributes and requirements (technical and economic).

(2) A consultation process which moves from an aggregate of individual wants to collaborative design based action to a political institution, with representation.
(3) And finally the movement in, and out, of consultation-to-political process which involved the author, the NGO (CURE), engineers, local government and contractors.
All of which might be considered part of the incremental process of growing a town and a civic society.

3.3.2 INCREMENTAL TRANSFORMATIONS LED BY THE ADDITION OF A TOILET

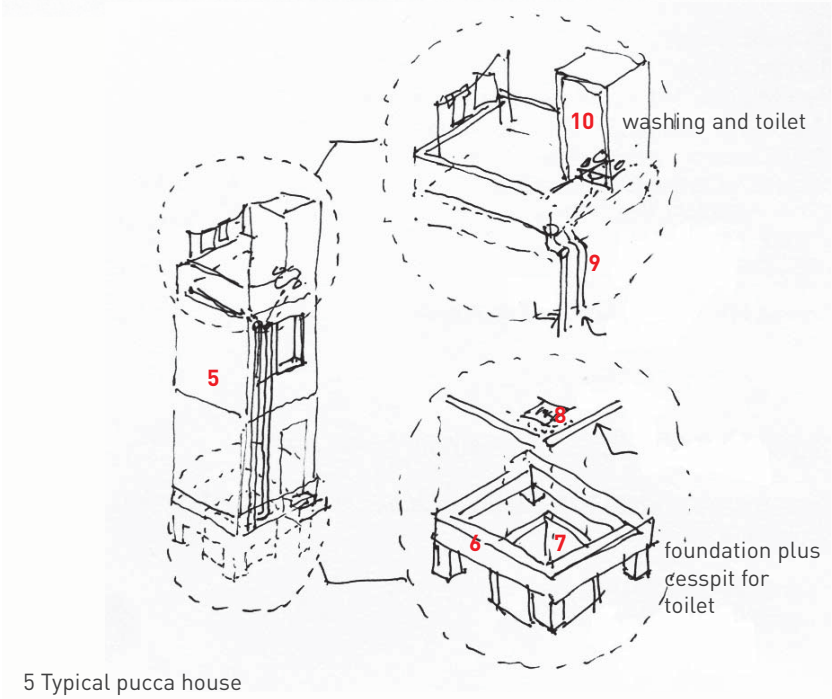
Survey work of households revealed a key transition in the process of incremental upgrades (image 3.3.2 and 3). Image 3.3.2 shows the Bengali family living in a one-storey semi-*pucca* (a term explored further in Chapter 3.5) house would wash outside their home and defecate in an open field. One year later having secured a job they made an investment in a *pucca* house with a toilet (image 3.3.3). Such an investment is often triggered by a daughter coming of age, as this case, or a new bride entering the home.

Image 3.3.2 [left] 3.3.3 [right] TYPICAL HOUSE TRANSFORMATION OVER TIME. On the left is an image of the Devi Bengali family's house in September 2010. On the right is the same house the following year. The story epitomises the incremental upgrade, centred on the inclusion of a household toilet. Upon arrival in 2007 the family built a semi-*pucca* house. In order to wash in privacy they built the bamboo structure which rests on a slab over the grey water / storm drain. In 2011 they decided to upgrade their home. Built on a concrete plinth they built 6 brick piers with a reinforced concrete ring beam to support the addition of two more floors which project over the ground floor at the front. The cooking, which before 2011 would happen in front of the house has now been moved upstairs whilst washing and cleaning has moved to the top floor. On the top floor is the toilet which connects to a pit located underneath the concrete slab. So although families can densify individually by building vertically they cannot treat effluent.



1 Typical kuccha house
2 Foundation of compressed earth and broken bricks
3 Corrugated tin sheet roof
4 Bamboo enclosure

Figure 3.3.2 TYPICAL SINGLE-STOREY HOUSE. The Bengali family placed a slab on top of the open grey water drains over which they wash their utensils and similar kitchen supplies. In order to wash their bodies with more privacy they have built a small *kuccha* enclosure over the drain similarly placed on top of a stone slab so that the water falls into the drains.



5 Typical pucca house
6 Brick pier foundation
7 Cesspit
8 Manhole to access cesspit
9 Grey and Black water drains

Figure 3.3.3. TRANSITION FROM SEMI-*PUCCA* TO *PUCCA*. The original foundations were unable to support a ground plus two-storey structure so they had to be rebuilt providing the opportunity to build a tank. The latrine is located in a brick enclosure at the front on the top floor such that the effluent pipe can connect easily to the pit dropping down the front façade. Washing has moved to the top floor and a grey water pipe has been installed which connects into the open grey water drains. As families invest in washing facilities for their homes they also start using more water which the drains cannot handle causing problems of flooding, blockages and usually affecting the poorer *kuccha* households which are not raised off the ground floor.

3.3.3 INDIVIDUAL VERSUS COMMUNITY RESOURCE

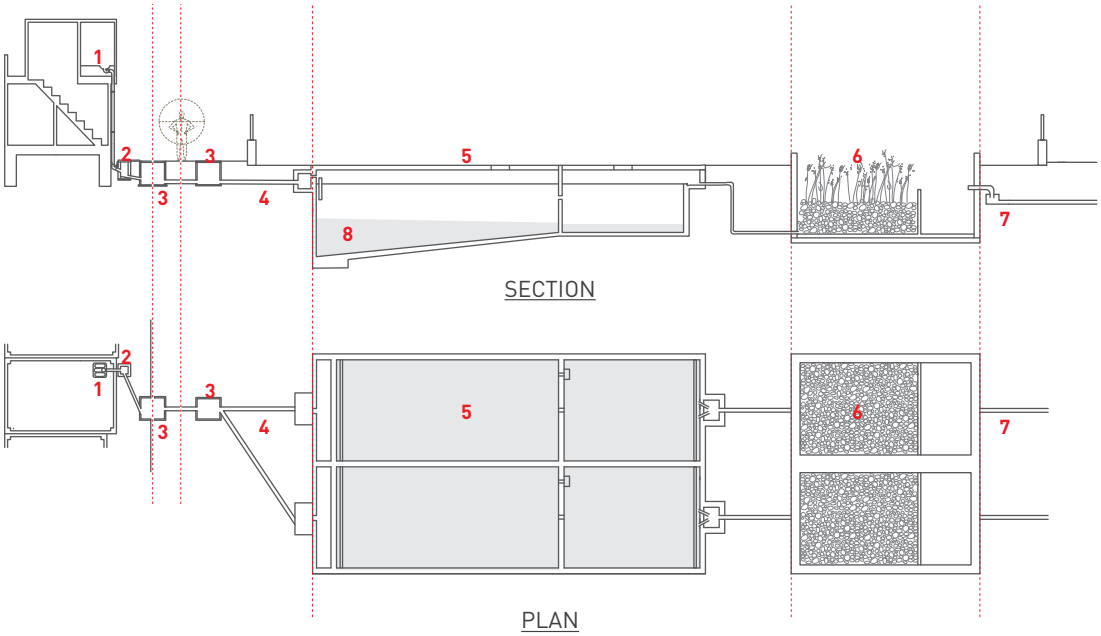
The issue of sanitation offers a *prima facie* opportunity for sharing based on two recorded conditions:

(1) In areas served by municipal wastewater facilities, sewerage is transported away from homes in large diameter sewers to a central plant where it is treated and discharged into a waterway. Outside these areas, most individual residences must rely on a septic tank and soil absorption fields to dispose of their black wastewater.

(2) The debilitating size of the residential plots in Savda Ghevra- whether 18sq m or 12.5sq m[1] - are, in most cases, 100% occupied and are therefore too small to contain, within the plot, any form of effluent storage and crucially, treatment. This means that although individual latrines can be provided, the treatment of the effluent must be outside the plot boundary and therefore, by default, communal, invoking shared ownership and responsibility.

A community system can bridge the gap between these two options in small communities where neither on-site or conventional sewerage, are feasible[2]. As a result of these considerations the proposed intervention was a community based sanitation system connecting individual (household) toilets to a shared septic tank and up-flow filter which forms a Decentralised Wastewater Treatment System (DEWAT)[3] which will treat mostly black water but can handle grey water as well (figure 3.3.4).

The DEWATS offers a technology capable of being built, managed and maintained by the community, as well as being capable of adapting to the rapid, haphazard, changes which happen on the urban fringe, the consequence of a lack of planning and infrastructure. The project posed a key question: Would the outcome establish the principle that a collective commitment and incremental techniques could "build" a town? Instead of demanding from the city, or state, often inadequate and certainly expensive 'services', there could be an important place, in the early history of a resettlement colony, for collaborative building of the primary connective tissue or infrastructure. A *gali* (street) is the result of an aggregate of individual houses, but a sanitation system is about the anonymous whole that is 'town' at the level of primary necessity. There is a direct connection between the physical and political collaboration necessary to obtain the level of general health and decency that is central to the identity of Savda Ghevra becoming a 'town', a properly empowered increment of Delhi.



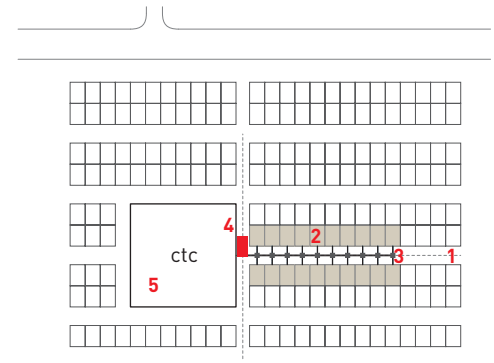
1 Household toilet
2 Toilet connects to household chamber
3 Which in turn connects to Manhole (multiple per lane)
4 Common sewer pipe
5 Two chamber septic tank (primary treatment)
6 Up-flow filter (secondary treatment)
7 Outlet for water for re-use
8 Sludge

Figure 3.3.4
DIAGRAMMATIC REPRESENTATION OF SANITATION PROPOSAL. The effluent runs from individual households via shallow small diameter sewers with manholes at pipework intersections to a large septic tank. In the septic tank the effluent mostly settles to form 'sludge' at the bottom of the tank and a thin 'scum' layer floats to the top. This process is called sedimentation. What remains in the middle, mostly water, is much cleaner and this is what flows into a second chamber repeating the same process. Once the tank fills the water will then run through an up-flow filter for secondary treatment. The filter is a gravel medium which further cleans the water mostly due to the presence of bacteria. What comes out of this is clean enough to use for agriculture, construction or to flow into the open drains which discharge the water into a canal, a natural watercourse called a *nalla*. All stages of this process require regular operation and maintenance, notably bi-annual removal of the sludge and scum and more regular manhole inspections.

3.3.4 DESIGNING AND IMPLEMENTING THE SANITATION PROJECT

The project began with a discussion on how we (CURE and myself) could get a group of 19 households access to private toilets (see box 3.3.1) using a shared septic tank. These families had been resettled to Savda Ghevra with assistance from the AKT which will be further discussed in Chapter 3.4.2 and 3.4.3. This scale proved difficult principally because the *gali* was too small for a complete system that could collect and treat wastewater locally. Furthermore there was no support infrastructure (such as drains) which could connect the smaller street scale septic tank elsewhere for further treatment. In addition to this, the families, who had been relocated by the AKT, as part of their compensation package had been given heavily subsidised housing, and were beginning to demand more services, for free, from the Trust. CURE, operating in parallel, and historically in partnership with the Trust, found working in this environment increasingly complicated. As a result, and after continued survey work, the project was moved to 'A' Block principally because there was an operating kitchen waste collection in the Block which the residents themselves were running.

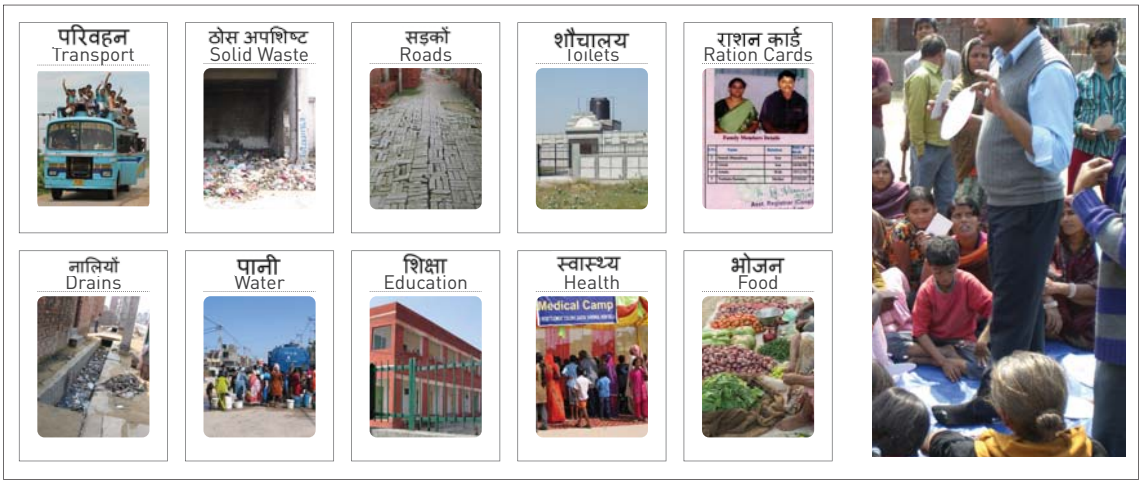
It was felt that this existing collaboration would be a good foundation to seed the idea of a shared sanitation system. The project was kick-started with a 'Cards and *Chapatti*' (box 3.3.2) general workshop mention in the Chapter 2. Ten cards, each representing typical concerns, were shown ranging from sanitation, ration cards, health care, and education etc. Then a series of round disks – called *chapattis*, playing with the imagery of bread accompanied at each meal – were distributed. The '*chapattis*' were then used as 'votes' for the most pressing concern to that individual. The use of '*chapattis*' is a technique that CURE came up with and use in many of their projects – the playful nature enables important and often loaded issues to be discussed. Predictably sanitation was voted as the most pressing concern allowing for a conversation about current practices, possible solutions, and how much of that could be shared and incrementally done.



1 AKT Street in 'D' Block
2 Houses part of the proposed scheme
3 Shared sewer pipes
4 Shared septic tank
5 Not functioning Community Toilet Complex

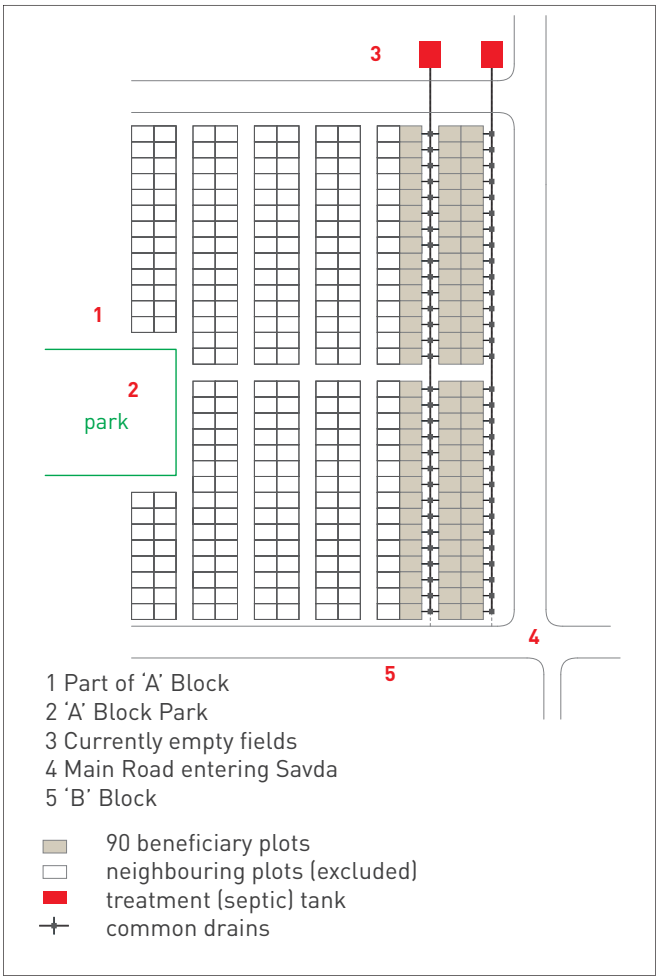
19 beneficiary plots
neighbouring plots (excluded)
treatment (septic) tank
common drains

Box 3.3.1 AKT STREET SANITATION PROPOSAL ONE. The original intention was to look at a street scale intervention. The 'AKT' street was a natural starting place because the borewell project discussed in Chapter 3.3 was already up and running in this street. However, there were complications from within the group of 19 families. Concerns raised included issues with payment if, for example, one family was larger than another thus generating more effluent. There were also technical issues involving the location of the tanks as the lanes (*galis*) are very small; raising issues of what to do with the outlet from the septic tank. In addition the whole area is very flat meaning that diverting waste along the natural fall of the land would be a challenge.



Box 3.3.2 COMMUNITY CONSULTATION (1) ON GENERAL NEEDS; CARDS AND *CHAPATTIS*. The cards each had ten different issues that are know general concerns for residents: transport, solid waste, roads, toilets, ration cards, drains, water, education, health and food.

Following the Cards / *Chapatti* consultation a concept design was drafted by the author which proposed a series of street-level septic tanks connected to houses (box 3.3.3) which would run the effluent to the north of the site in 'A' Block.



Box 3.3.3 'A' BLOCK STREET LEVEL PROPOSAL TWO. The proposal although it focused more on the household connection stipulated two key conditions: (1) that the effluent would be collectively treated with numbers to be confirmed and that (2) houses could connect individual toilets, and crucially existing toilets into this decentralized infrastructure.

At this stage a brief for this project was established between the author, operating as designer / consultant and CURE as the implementing agency. The objectives were: to design individual (in-house) functional toilets that were affordable and replicable; to develop a system that could be managed, built and run by the community making use of local labour and skills therefore encouraging ownership; and to develop an urban model that was future proof both in terms of working with the MCD masterplan and the rapid growth of the Delhi urban fringe. The proposal was shown at a community workshop (image 3.3.4), again located at the park in 'A' Block where residents were asked to get involved, ask questions, raise problems and for general concerns to emerge and be recorded.

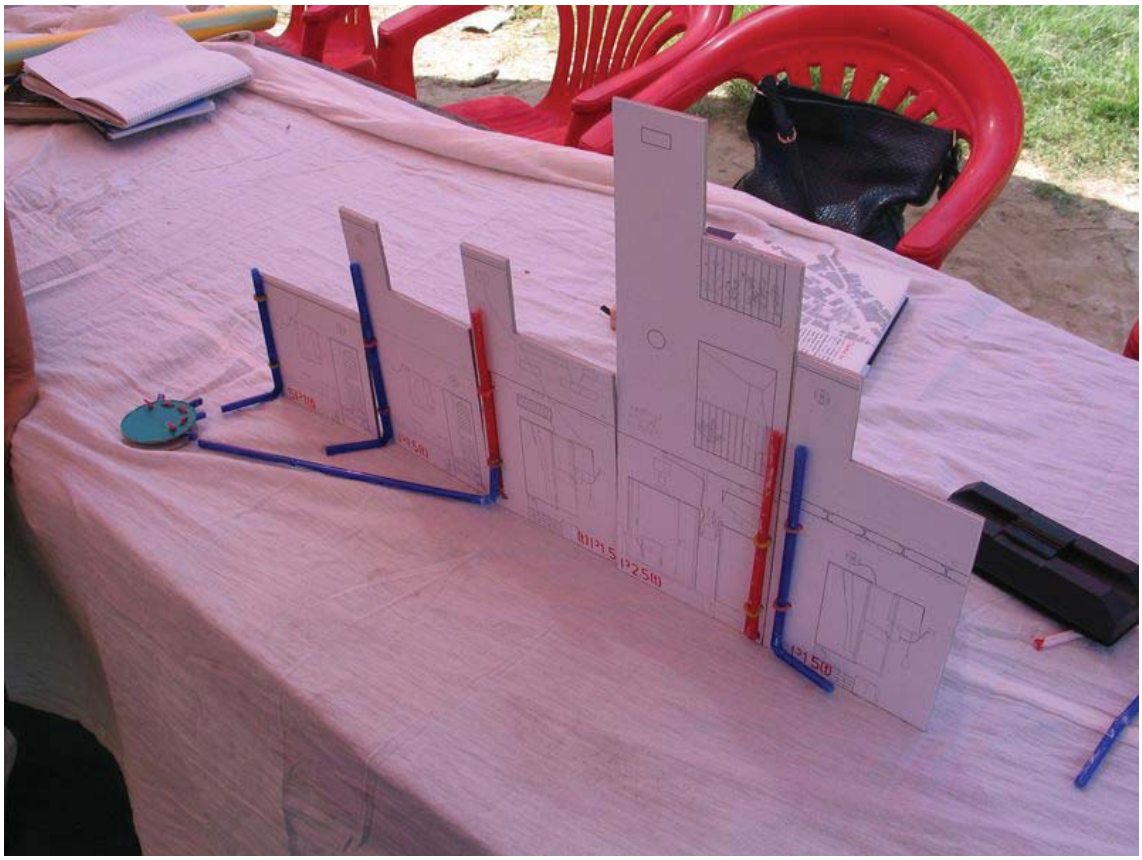
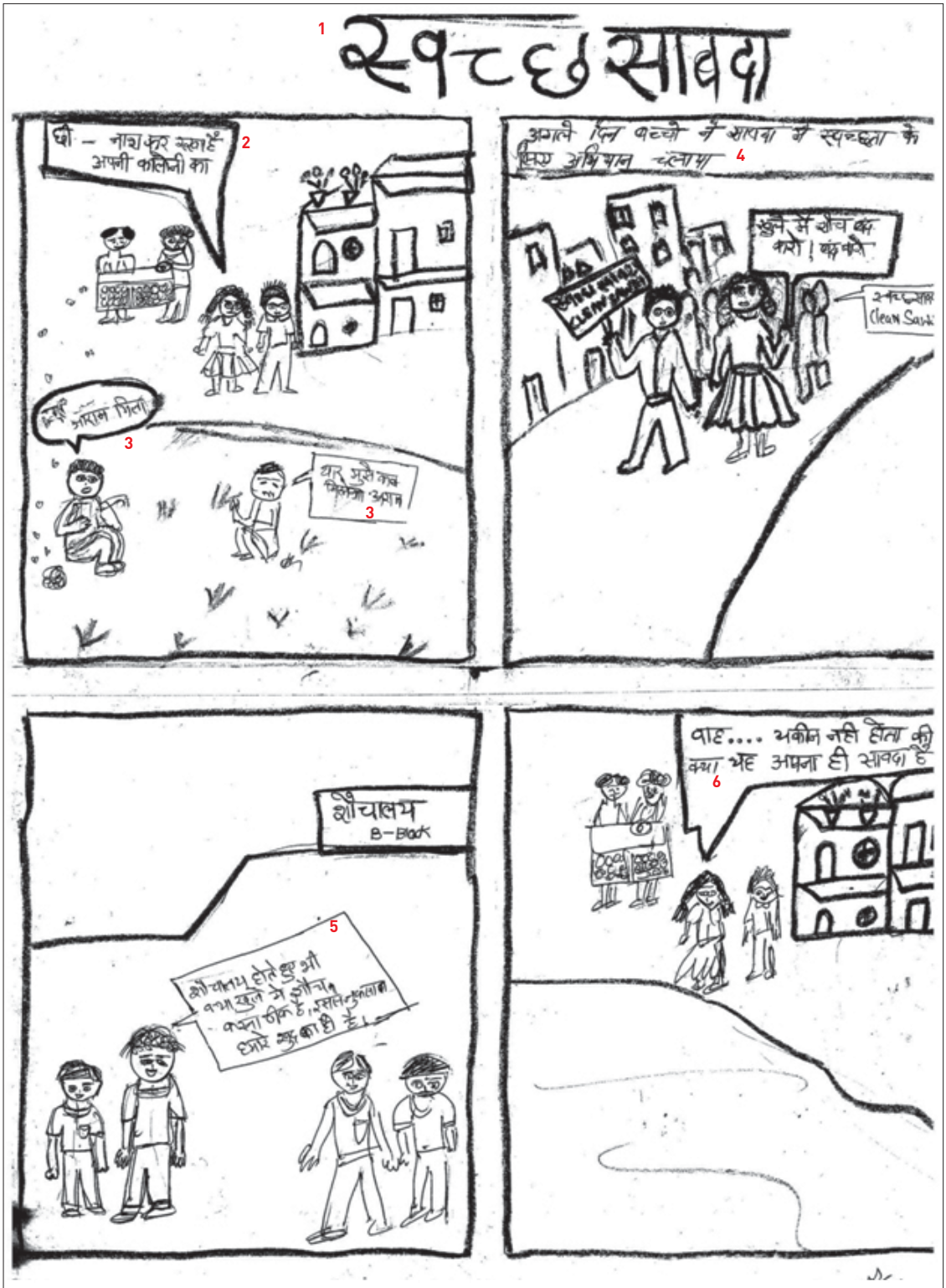


Image 3.3.4 COMMUNITY CONSULTATION (2). Sanitation proposal; Models with straws as pipes. Like previous sessions the consultation was set in the park at the centre of 'A' Block and everyone was welcome to attend. Using coloured straws it was shown how the proposal could adapt to each house type.

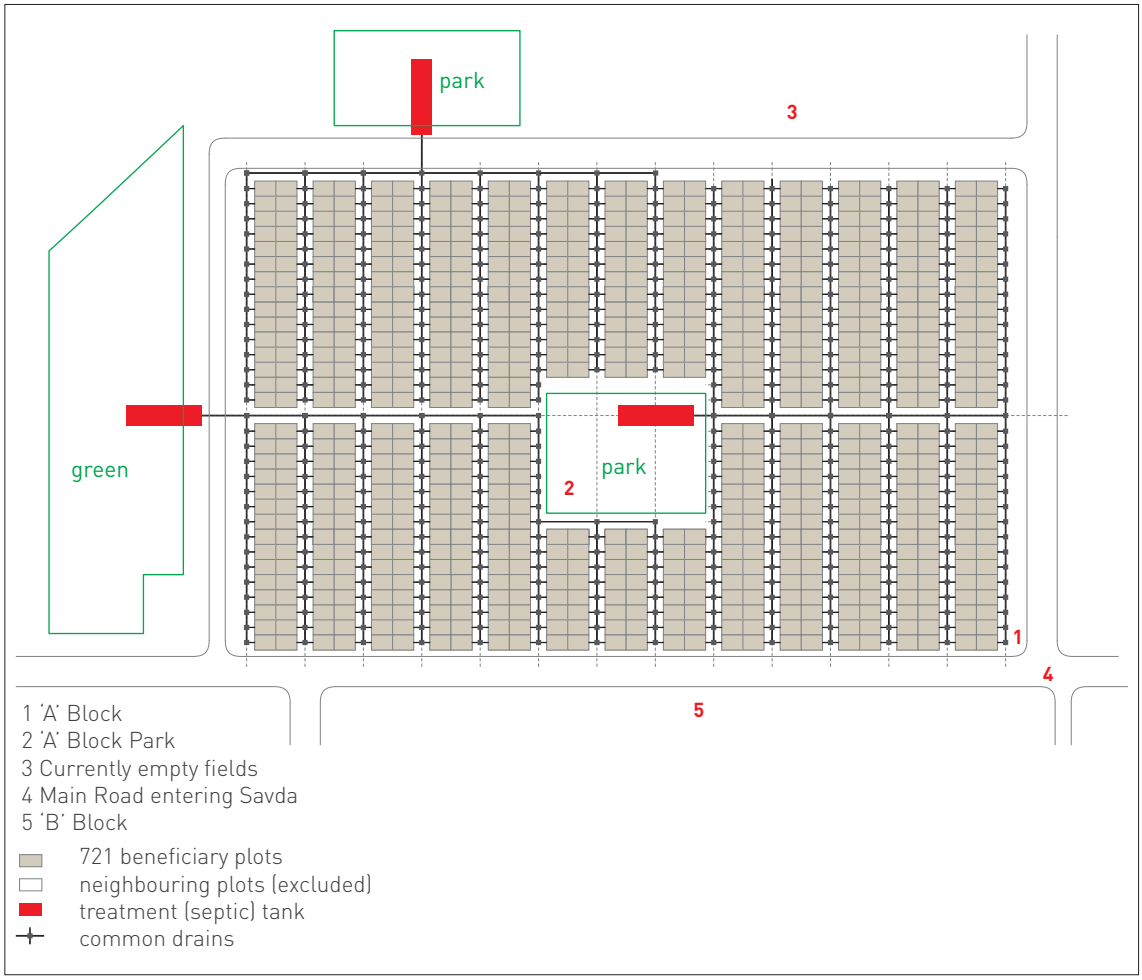
Communication tools included the creation of comics made by the Savda Ghevra Youth Club (image 3.3.5), a local youth club also supported by CURE.

1 "Hi Golu, You know why people get ill now a days in Savda?
"Because people defecate in open?"
2 "No Dear I don't know, but I read somewhere, let's go and create awareness about that."
3 Golu and Bholu reach Savda and create awareness.
4 "You know you are inviting so many diseases in Savda"
5 "No"
6 "If you don't know then try to understand if you defecate in open then so many diseases will come, so to avoid that please use community toilet"
7 CommunityToilet
8 "Clean toilet"



1 "Clean Savda
2 "Oh! so stinky!"
3 "I feel relaxed"
4 Next Day youth club organized a clean campaign
5 "We will also use toilet we will not defecate in open now."
6 After some days..."Wow we cant believe is this Savda so clean."

Once there was sufficient community support for the project, two major issues, aside from the technical design, needed consideration to realise the project: funding and government approval. Again, this involved a re-design (box 3.3.4) resulting in using park spaces (image 3.3.6) to locate the communal infrastructure. A sanitation plan – proposing how to roll-out DEWATs for all of Savda Ghevra - was developed (figure 3.3.5).



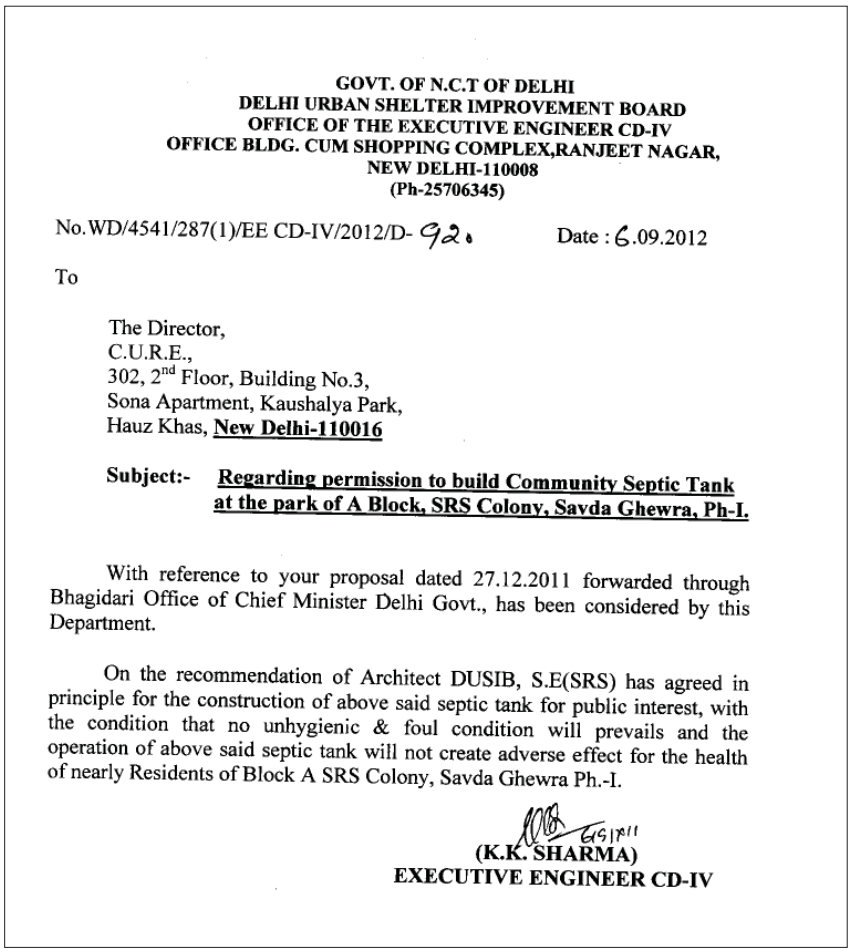
Box 3.3.4 'A' BLOCK PARK PROPOSAL THREE. Breaking down 'A' Block into catchment areas of 350 households resulted in requiring three sets of DEWATS which could be located in the three parks within the block. Although the area is currently full of empty space this will not always be the case; we didn't want to construct something that wouldn't work in the future if plans went ahead. The only spaces that could be guaranteed to remain empty were park spaces.

Image 3.3.6 MISUSE OF PARK SPACES. Most of the parks are misused for open defecation, informal dumping of solid waste, and/or remain vacant. Locating the project underground in the parks would not only make the scheme replicable – in that the masterplan is divided into blocks each with its own park – but it would serve as a catalyst to clean up and maintain this shared public space.

Figure 3.3.5 (next page) PROPOSED SANITATION INTERVENTION FOR THE WHOLE OF SAVDA GHEVRA. This exercise examined the feasibility of a strategy which broke down the blocks into clusters of 350-400 households and located the treatment tanks in park spaces .The exercise established potential feasibility and also allowed for the team to speculate on the associated costs to bring decentralized sanitation to the whole of Savda Ghevra in comparison to conventional costs which the government had already costed. This feasibility study showed that if the proposed system was implemented throughout the whole of Savda Ghevra (including the planned but unpopulated areas) the total cost would be 25% of a conventional system.


LEGEND
existing plots
proposed plots
existing ammenity buildings
proposed ammenity buildings
existing parks
proposed parks and green spaces
existing roads
proposed roads
pylon
canal (nullah)
SG boundary
septic tank
shallow sewer
shallow u channel
reed bed
water tank
compost
GRID STATION
COMMUNITY CENTRE
BURIAL GROUND
CREMATION GROUND
SEWERAGE TREATMENT PLANT PHASE I
HAWKER MARKET
POLICE STATION
GAU SHALA & TEMPLE
POST OFFICE
TELEGRAPH
NURSERY
0m
100m
250m
500m

The plan in figure 3.3.5 along with detail designs, finances and post-construction strategy was sent for approval. On 6 September 2012 a formal letter was issued permitting the construction to build the Sanitation Project: referred to as the Cluster Septic Tank (CST) (see figure 3.3.6). Receiving permission solved one problem and started another: how to fund the project? Soon after receiving permission CURE presented the project to the Sir Dorabji Tata Trust (SDTT)[4] who redirected $40,000 to fund the project. However securing this funding was challenging and deserves a mention. Many organizations in India, including SDTT, have a policy of not funding infrastructure projects that they believe the state should be funding. This was a challenging position. On the one hand private and philanthropic organizations are reticent to fund infrastructure and on the other hand the state was interested in the project and, if the initiative was shown to work, would listen and open tenders for such a project in the future, but felt at the pilot stage it was too innovative to fund. However, this interpretation was challenged by the implementation team by presenting the project not as a 'plumbing' project but as a community building and livelihoods project, focusing on the catalytic effect of community engagement. Following this, the final and last major redesign of the project (box 3.3.5) took place which reduced the scope of works to how much we could afford.



GOVT. OF N.C.T OF DELHI
DELHI URBAN SHELTER IMPROVEMENT BOARD
OFFICE OF THE EXECUTIVE ENGINEER CD-IV
OFFICE BLDG. CUM SHOPPING COMPLEX,RANJEET NAGAR,
NEW DELHI-110008
(Ph-25706345)

No.WD/4541/287(1)/EE CD-IV/2012/D- 92 Date : 6.09.2012

To

The Director,
C.U.R.E.,
302, 2nd Floor, Building No.3,
Sona Apartment, Kaushalya Park,
Hauz Khas, **New Delhi-110016**

Subject:- Regarding permission to build Community Septic Tank at the park of A Block, SRS Colony, Savda Ghewra, Ph-I.

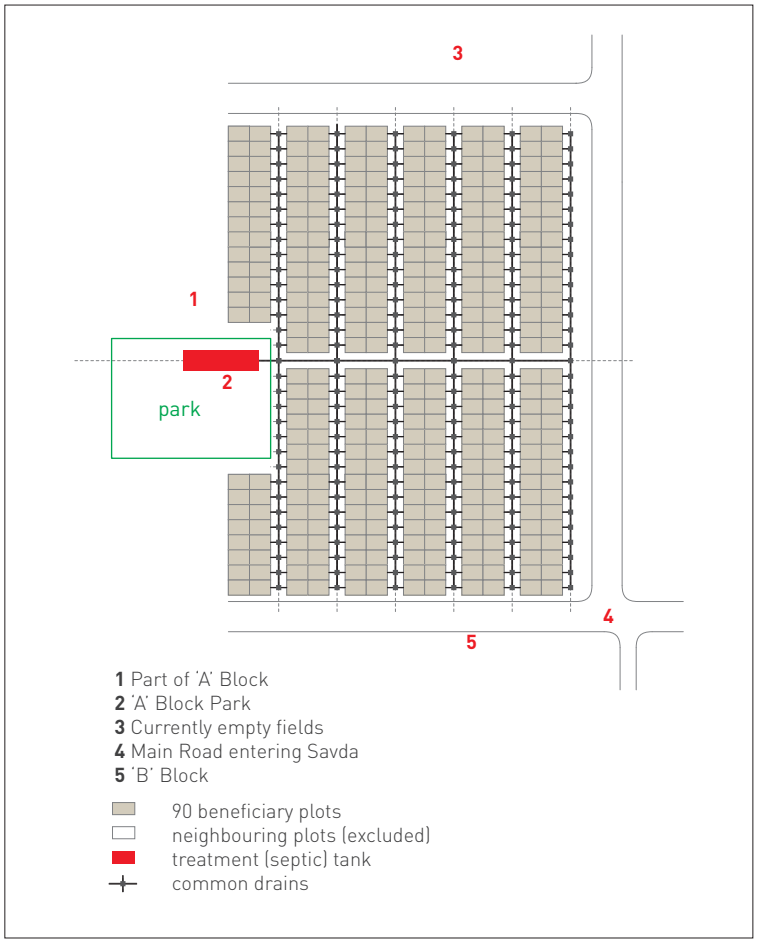
With reference to your proposal dated 27.12.2011 forwarded through Bhagidari Office of Chief Minister Delhi Govt., has been considered by this Department.

On the recommendation of Architect DUSIB, S.E(SRS) has agreed in principle for the construction of above said septic tank for public interest, with the condition that no unhygienic & foul condition will prevails and the operation of above said septic tank will not create adverse effect for the health of nearly Residents of Block A SRS Colony, Savda Ghewra Ph.-I.

6/9/11

(K.K. SHARMA)
EXECUTIVE ENGINEER CD-IV

Figure 3.3.6 PERMISSION TO BUILD. This is the document issued by the Government of New Delhi via the Delhi Urban Shelter Improvement Board (DUSIB) approving, in "the public interest" the construction of the Sanitation Project renamed the Community Septic Tank (CST). The significance of this should not be missed as such permissions are notoriously hard to find and often take years.



Box 3.3.5 FINAL 'A' BLOCK PARK PROPOSAL FOUR. The final proposal and what was built will caters for 322 households, almost half of 'A' Block.

Figure 3.3.6 shows in more detail the final drawings for the build. True to the initial diagram the effluent is transport through a street level network of manholes and pipes into the primary and secondary treatment in the park. Figure 3.3.6 include a section through the main pipe work leading into the septic tank. Figure 3.3.7 details how houses will integrate toilets in order to connect into the system. The expectation is that sanitation will enable and trigger investment into housing now that the area is serviced.

Figure 3.3.6 PROPOSAL PLAN AND SECTION. Detail drawing of the project illustrated from engineering drawings.

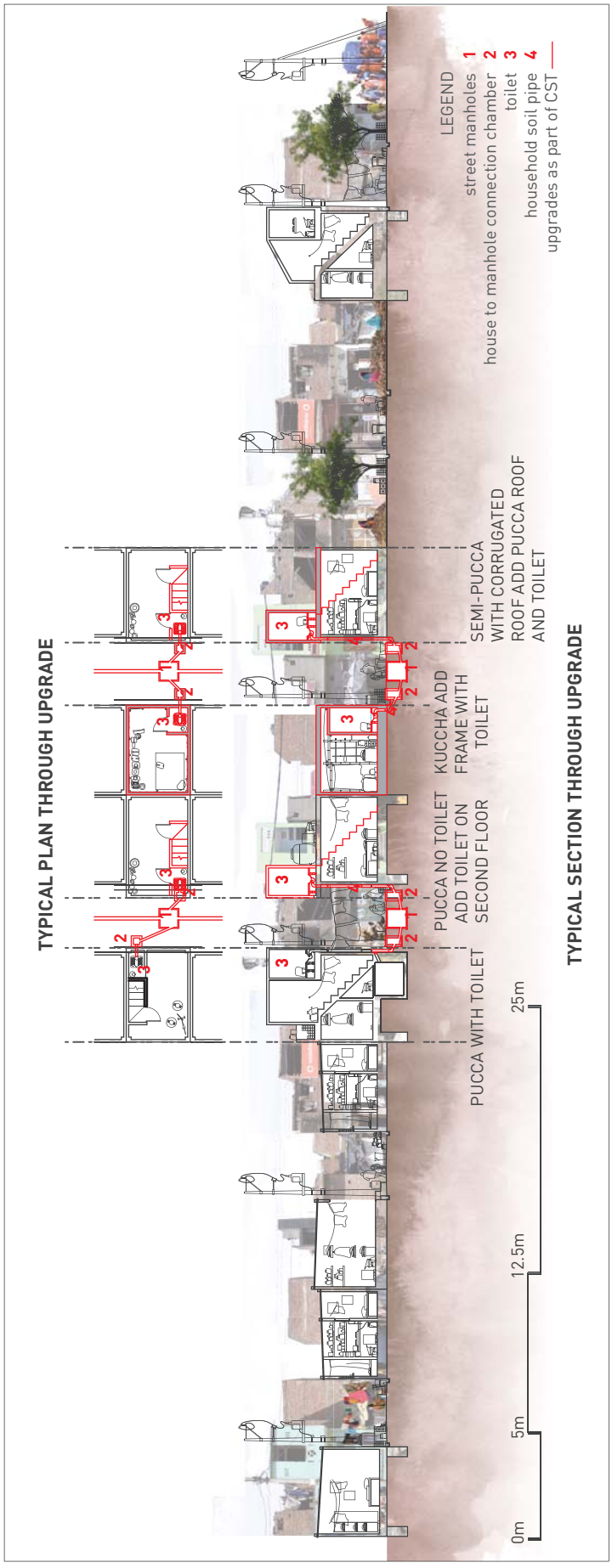


Figure 3.3.7 SANITATION LED HOUSING. This diagram explores how the arrival of sanitation triggers a housing economy as families invest in an in-house toilet.

The opening ceremony occurred on 16 April 2013 (image 3.3.7) and construction began the following day. By 25 April the excavation work for the septic tank was complete (image 3.3.8). The infrastructure was completed in January 2014 and currently (June 2014) work is continuing, in terms of upgrading homes with toilets to connect into the system. To date (20th August 2014) 13 households are connected and using the infrastructure and a further 50 have signed up (paid a membership fee).

Image 3.3.7. *PUJA* CEREMONY. Like the Core House project the Sanitation Project was inaugurated with a *puja* ceremony. Although most of the residents of 'A' Block are Bengali they are also Hindu and not Muslim. The ceremony, in general, would only be attended by Hindus but because it was such a large project affecting the whole community, it was widely attended.

Image 3.3.8. EXCAVATION WORK FOR SEPTIC TANK AND UP-FLOW FILTER. The septic tank services up to 350 households, with an average of six people per household, with a two year maintenance plan.

3.3.5 SHARING AND INCREMENTAL UPGRADES AT HOUSEHOLD LEVEL

By delivering what the community cannot do themselves – sewerage – an open system for what they can do was created at the household level, encouraging and building upon current incremental growth patterns. In terms of design this meant building a system that was capable of adapting to piecemeal growth, as opposed to systems that are installed in one fell swoop which would have left many residents unable to benefit.

The concept of piecemeal growth forms part of what Maurice Mitchell (2014) refers to as 'loose fit' versus 'tight fit' in a context where things are changing rapidly. For designers the question becomes how well should a product fit (both physically and culturally) the context; an interplay between standardisation (tight fit, usually made in a factory) and the particular (loose fit), aspiring to engender creativity. The incremental approach supports loose-fit principles where the 'product' can fit within a range of circumstances. For example, families can connect, as and when, into the system, and more manholes can be installed as more houses connect. What CURE calls the 'copycat syndrome' - and is widely reported in development economics as 'social learning' (Duflo, 2006) - is behind much of this thinking; past experience has shown that once a few people make the leap others will follow. This will also enable even the poorest of households, who might take more time to gather the funds, to connect into the system when they can[5].

During construction work on the sanitation project a series of workshops were run which looked at how to incorporate toilets into existing homes working with local contractors. During this design process the issues that were raised included wanting to place toilets on the second floor so as to separate the kitchen and *mandir* (prayer) spaces typically on the ground floor from the toilet. The issue of how to upgrade homes introduces several opportunities to test sharing against incremental additions such as party walls, shared pipes and shared rainwater harvesting to flush toilets.

3.3.6 SHARING AND INCREMENTAL UPGRADES AT STREET LEVEL

The demand for sanitation, the process of engaging and developing the technology, and financing models has arguable helped the community come together. Repeated interactions in the form of meetings and discussions (image 3.3.9) are purposefully transparent and inclusive. They are often held with everyone sitting on mats, on the floor, sharing drink and food. The result has been that certain members have become very involved with the project, culminating in the emergence of street management teams signalling a higher stage of political awareness and function – and, of course, trust.

Image 3.3.9 SHARING DESIGNS WITH STREET LEADERS. Meeting to present six street leaders with options for house upgrading so that they can share designs with their respective neighbours and report back issues and problems.

In order for the project to develop, building on and expanding local capacity and skills, it was important to institutionalise operation and maintenance strategies. Using the street leaders as a bridging body between the NGO, technical consultants, and the community also enabled the establishment of a network of people to form part of the longer (post-construction) management. The street leaders mobilised smaller groups and had meetings to discuss how to deal with construction and have formed money collection groups to fund the shared operation and maintenance. These meetings have become *de facto* settings to discuss the general environment and strategies to make 'A' Block a better place. Solutions such as a concrete screed, as a washing surface, are suggested so as to minimise wastewater, along with shared rainwater harvesting.

Initial street meetings revealed how sharing sanitation also meant sharing problems. Individual sanitation solutions, that only a small group could afford, were having an adverse effect on the whole community; household waste was spilling out into shared drains and often overflowing into the poorer *kuccha* houses that couldn't afford to build a raised ground floor plinth. Street meetings became opportunities for local residents to raise concerns. In addition such meetings helped inform the design process. For example initial designs only dealt with black water, however, during street meetings the issue of grey water compelled the team to ensure that the technology could also take grey water.

3.3.7 SHARING AND INCREMENTAL UPGRADES AT NEIGHBOURHOOD LEVEL

The arrival of sanitation has inspired families to want to invest in their homes. CURE and others had observed that there are already informal loaning groups, particularly among women. These are shared revolving credit loan facilities managed informally and locally outside of the state or banking sector, and CURE began to research how to improve and expand access to credit. Many of these informal groups are based on long-term social networks formed prior to arrival in Savda Ghevra when the residents were city-centre slum dwellers.

During interviews one such informal lender, Saraswati, made the case that helping others was helping herself: that if she can help pull others out of poverty traps, the whole neighbourhood will benefit in terms of hygiene, a clean environment and a community moving forward positively. Rather than ignore such initiatives, current work by CURE is supporting and empowering these shared informal institutions[6]. CURE is also trying to link formal loan agencies and the residents of Savda Ghevra. The Bank of India supports numerous micro-funding credit agencies throughout the country. But in a bizarre move by the state, although the residents have been enticed into home ownership, the Bank of India prohibits the release of funds to credit upgrades in resettlement colonies like Savda Ghevra limiting various agencies from helping families.

Because of the funding shortage for the Sanitation Project, the current pilot scheme is only catering for about 40% of the block. This has proved to be a challenge since the whole block is sharing in the process, insofar as the park was a construction site – and a visible indicator of the project. Yet the benefit will not, immediately, be shared by everybody. The residents' management team dealt with this setback by being transparent in communicating the reality of the funding shortfall but also by focusing on the positive: the fact that the government has granted permission for the project to go ahead which has proved to be a real boost in confidence for non-beneficiary residents. There are ripple effects in the rest of Savda Ghevra; on the back of approval being handed to 'A' Block, 'C' and 'B' Block has formed a group of representatives who are lobbying the government for their own version of the Sanitation Project. The most positive step forward was achieved on the back of the shared management of the project: a formal organisation has emerged from 'A' Block in the form of a resident's welfare association (RWA), the first of its kind in a slum resettlement colony in Delhi. RWAs are typically associated with groups of upper and middle class private property owners organised at the neighbourhood level (Ghertner, 2011). The significance of this as local institution building will be explored further in Chapter 4.

3.3.8 SHARING AND INCREMENTAL UPGRADES AT CITY LEVEL

Clearly the Sanitation Project became an advocacy tool for the residents to negotiate with the state: at first via the NGO and afterwards through the RWA. Over the course of 18 months, the project was built up from individual desires, to street teams, to a neighbourhood committee, to an RWA connecting directly into government and claiming (although not necessarily receiving) the benefits the city has to offer. Figure 3.3.8 combines the diagrams and photography used in this chapter and shows these events along the time line when they happened. Here research and design can be seen as an interplay. Aspects such as funding and publicity which has not been discussed is displayed here as these moments served to galvanize the team, and to legitimize the project in light of external recognition.

BOX 3.3.2

Community Consultation (1)
'Cards and Chapatti' general workshop

Community Consultation (2)
Straws as Pipes Models

Community Consultation (3)

Community Consultation (4)

Construction Starts: 'Puja' Ceremony

Construction Complete

COMMUNITY ENGAGEMENT

PRESS& FUNDING

Sanitation Project wins Holcim Award in Next Generation Category in ceremony in Singapore

Indian Express article

Presentation at India International Centre, Delhi & article in Time Out

article in Interiors & Decor magazine, Mumbai

name 'Future 50' in ICON magazine in London

article in Creating Change magazine, Delhi

Sanitation Project short listed for a World Design Impact Prize

TIMELINE

2010 SEP
2011 FEB MAR
JUL SEP
2012 MAR MAY JUL AUG SEP
DEC 2013 APR
DEC 2014

SG Ferrocement (2)

CAT explore concept of ferrocement

CAT Ferrocement (1)

meeting with MCD

site visit with engineer

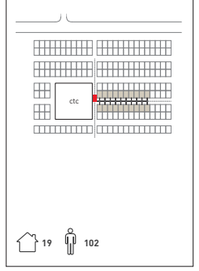
CAT Ferrocement (3)

permission to build CST by the MCD

TIME BAR LEGEND
- preparation & breif
- concept stage
- detail & technical design
- construction (if applicable)
- in use

DESIGN EVOLUTION

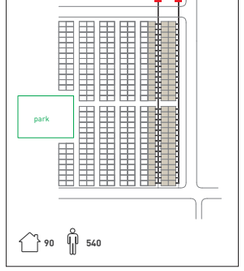
BOX 3.3.1
AKT Street Sanitation



Resistances:
Size of community

Accommodation:
Moved site

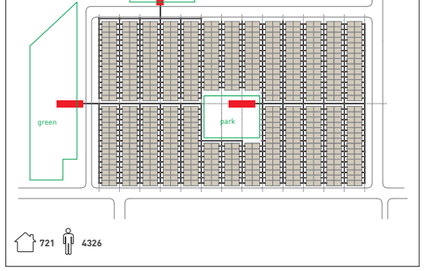
BOX 3.3.3
'A' Block Street Level



Resistances:
Location
Compliance with MCD Masterplan

Accommodation:
Moved Location

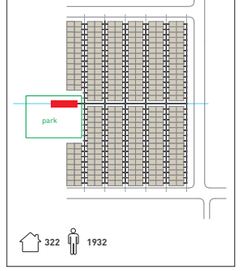
BOX 3.3.4



Resistances:
Space
Funding
Approval
Compliance with Indian code

Accommodation:
Moved site
Engage with engineer

BOX 3.3.5



LEGEND
- beneficiary plots
- neighbouring plots (excluded)
- treatment (septic) tank
- common drains
- ctc broken toilet complex

Figure 3.3.8 PROJECT TIMELINE. Set along a timeline the overlapping process of community engagement, press and funding, and the design evolution are laid out.

3.3.9 CONCLUSION

Community consultation which began in 2010 is continuing, in part because houses are still connecting into the system, but also because delivering a sanitation solution to an existing settlement is not simply plumbing but a deeply social and political endeavour. For any solution to work and to be sustainable, the retrofitting of such infrastructure requires, and is required, to obtain resident buy-in. This is complex metabolism, (particularly when imagined at a master planning scale) and the important nuances are easily lost. Retaining that local, bottom-up capacity on an urban planning scale is essential if the project is to be taken forward. And furthermore the shared component of this process contribute to a resident's engagement with the city at all scales, reinforcing the idea of city building as a process which facilitates citizenship.

In conclusion, sanitation systems used in industrialised countries evolved through a series of successive improvements more than a century ago. Individual practices of bucket latrines were replaced by communal systems of piped water and sewerage. It would be simplistic to think that sanitation in developing countries should upgrade in a single step, ignoring this additive processes, accompanied by legislation which reacted to particularities of time and place. India is still facing a huge growth of its urban population whose improvements of conventional sewerage neither the individuals nor the state can afford.

3. MODALITIES OF SHARING AND 'INCREMENTALISM'

PART TWO:

URBAN INCREMENTALISM AND SHARING, HOW MUCH INCREMENTAL(ISM) AND SHARING IS THERE IN DELHI RESETTLEMENT COLONIES, PRINCIPALLY SAVDA GHEVRA?

3.4 WHAT PEOPLE SHARE AND DON'T SHARE IN SAVDA GHEVRA

The following Chapter explores (and speculates on) the principles that encourage sharing and mutual responsibility, asking what kind of sharing does and does not happen in Savda Ghevra. Following the live projects (Part 1) which actively provoked a response, the following three sub-Chapters research existing conditions (case studies), to develop insights alongside those gained through research by 'making'.

3.4.1 INTRODUCTION

Baby is a 16-year-old resident of Savda Ghevra. She gets up every morning at around 4am and takes a long walk out into the surrounding fields to relieve herself. She shares this experience with all the other women in Savda Ghevra who don't have access to sanitation. She takes with her a plastic bottle of water, which she will use to clean her hands and bottom. She studies at the local school and every afternoon, after class, her homework will be interrupted by the arrival of the Delhi Jal[1] Board (DJB) water tanker (image 3.4.1). She knows of the arrival of the tanker through the other girls and women in the area by word of mouth and will rush to get water. She will collect approximately 40-50 litres in various buckets which she will carry back to her house. She does this every day. She will probably do it for the rest of her life.

Image 3.4.1 WOMEN COLLECTING WATER FROM A DJB TANKER. Piped water networks have not been planned for or built in the area which is predominantly reliant on water tankers. 98.6% of residents rely on DJB water for drinking and 72.5% for general purposes. Because of ground level water pollution only 0.9% of the population rely on sourcing their drinking water from community or individual pumps (CURE, 2010). One problem of this water delivery system is that there is a lot of wastage as the water falls on the ground in-between the placement of buckets when collecting from water tankers.

In Savda Ghevra, like most parts of the developing world, water and sanitation, and gender have a strong relationship because women typically cook, wash, and take care of their children's hygiene. In urban areas this relationship is aggravated by the high cost of living resulting in women increasingly working to earn cash to pay for services which are scarce, insecure, unhealthy and costly. There are no plans to bring in a piped water network to the area so residents have begun to seek alternative methods of sourcing water because of the inconvenience of the state DJB tanker delivery system. The principal inconvenience noted during interviews, focus groups and according to local non-governmental organization (NGO) workers is that the tanker does not come at a regular time or place so collecting water from the tanker can involve having to drop whatever one is doing to transport water across the 250-acre site at a moment's notice.

The market offers principally two alternatives: private tankers or private bore wells / hand pumps. Less than 1% of people get their water from private water tankers; and 5% of Savda Ghevra families have invested in private borewells or handpumps (CURE, 2010, p.15). However, due to groundwater pollution, pumped water is only used for general purposes whilst tanker water is reserved for drinking. Between the state and the market there is an alternative response which can loosely be described as a common, or community resource, which is shared. The following examples will highlight a number of shared resources that form part of survey work and projects done by independent agencies during the time spent in the field, recorded but not directed by the author.

3.4.2 SHARED BOREWELL ON THE 'AKT' STREET

With such difficult access to water, this case study - a shared borewell – was initiated by 19 families who were resettled from Nizamuddin, an inner city neighbourhood, to Savda Ghevra in 2010. The resettlement was overseen and assisted by the Aga Khan Trust (AKT), a global development foundation with offices in Delhi amongst others globally. The 19 families were all relocated to one street in 'O' Block, Savda Ghevra, with ten houses in two facing rows. The community asked Centre for Urban and Regional Excellence (CURE) to help them put a project in place based on everyone wanting to have access to water in their street but not being able to afford individual (household) borewells. As a result two communal borewells (shared by the residents of one street) were installed at either and opposite ends of the street (figure 3.4.1 and image 3.4.2, 3) at a cost of 10,000 Indian Rupee (INR) - approximately £100 (in 2014) - which was shared between the 19 families. The credit was provided through the Mahila Housing Trust (MHT) with the AKT bearing 50% of the loan and the 19 families the other 50%.

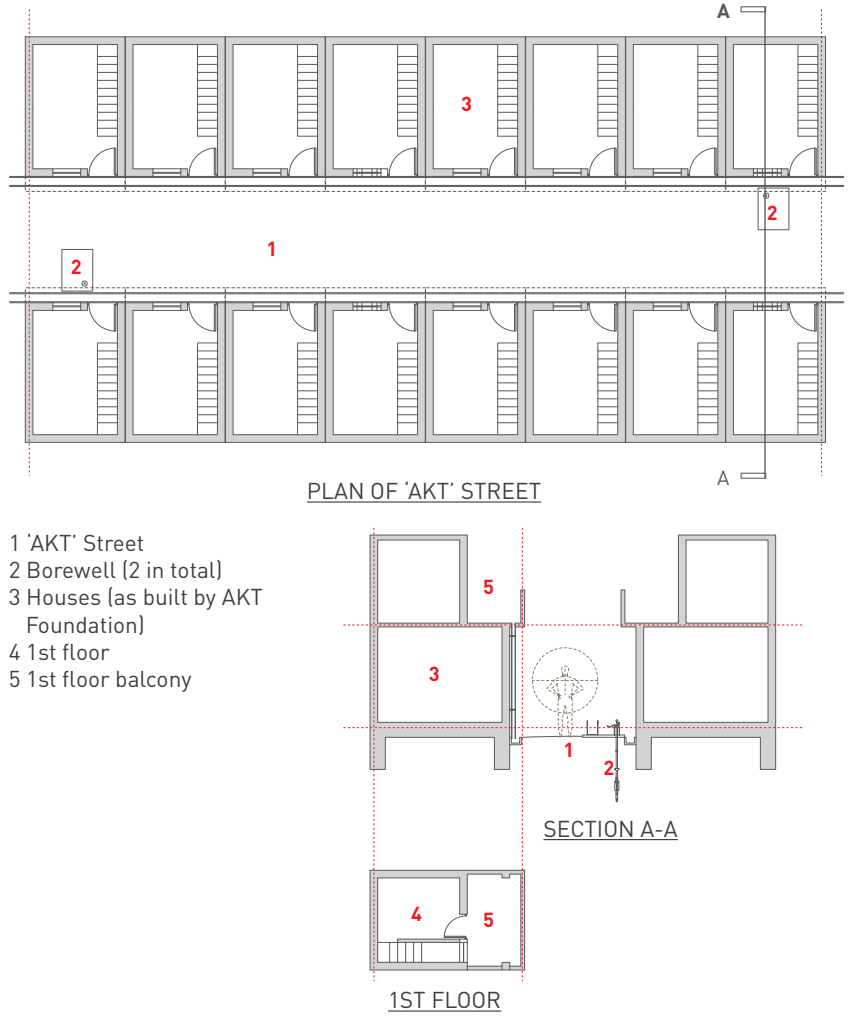


Figure 3.4.1 PLAN OF AKT STREET AND LOCATION OF BOREWELL. The AKT Street houses were designed and built by the AKT who assumed the whole cost of resettlement (including housing) as they felt responsible for the displaced families. The families were displaced from their original homes because the AKT was renovating an old step well in Nizamuddin Basti (an inner city neighbourhood). These 16 families illegally (as slum dwellers) lived on top of this well and were causing it to collapse. With no legal title and no space in Nizamuddin for them to be relocated locally they ended up in Savda Ghevra. Because the AKT built their homes, unlike other self-designed / built houses, they are all the same.

Image 3.4.2 INSTALLED BOREWELL. Small scale changes occur following the arrival of the borewell as the urban fabric accommodates this. The borewell is placed on a plinth which is to secure the borewell but is also part of a legitimizing process. The area surrounding the borewell is roughly paved with broken left over bricks which helps drain away the water which spills to the ground as people fill up their buckets. What might look haphazard is a sophisticated low cost response to infrastructure.

Image 3.4.3 INSTALLED BOREWELL AND PLINTH.

When the borewells were planned by the community, assisted by CURE, the primary concern of the families was that, if the pumps drew water from a single electricity feed, those costs would be shared equally by the street as a whole, irrespective of use. Thus larger families would essentially 'free-ride', paying the same as smaller families but extracting more water. Others might waste water with the whole group bearing the cost of such negligence. An operational 'sharing' strategy had to be put in place which enabled the individual families to achieve the outcome they wanted, water available in their street, without having a structure that enabled free-riding. The one-off installation cost was shared equally by all families; but the ongoing cost - which is the cost of the electricity required to pump the water is borne by the individual household meaning any abuse (of meters) or waste falls to that individual; an operative structure that institutionalised responsibility with no wastages reported since implementation. The result is that each individual family unit pays the electricity to extract water and by doing so can exercise their individual desires and responsibilities within a community resource.

3.4.3 'AKT' HOUSES

In Savda Ghevra due to small plot sizes, large families, and the lack of services inside the house, living activities spill out on to the street, a characteristic common to most poor urban communities. Women can be seen sitting together, combing each other's hair, talking and even working on the steps of their homes suggesting a sense of conviviality. As changes occur, in this case access to water, normative patterns of behaviour also change, for example, cleaning and cooking that once happened with less water on the street moved to designated areas within the house using more water. The arrival of the borewell and subsequent access to water has triggered significant incremental improvements to what is now referred to as the 'AKT Street'. As the houses grow incrementally, more activities have moved from the communal street areas into the house. When architect Shveta Mathur from the AKT was designing the houses for the families, she anticipated these changes, recalling that the residents wanted the structure on the first floor to be as temporary (or as adaptable) as possible (image 3.4.4). Enabling each family to be able to transform their house to not only meet their individual needs but also aesthetics (Mathur, 2010). Images 3.4.5 and 6 show the transformations that have occurred before and after the installation of the borewell; respectively September 2010 and December 2011.

Figure 3.4.4 'AKT' HOUSES. The simple brick and concrete houses were designed such that the residents themselves could alter and add-on with ease. For example, rather than have a *pucca* reinforced concrete roof on the first floor they were covered with corrugated steel sheets. This project was completed in 2010, just as the field work started and has no relation to the Core House project (Chapter 2.3).

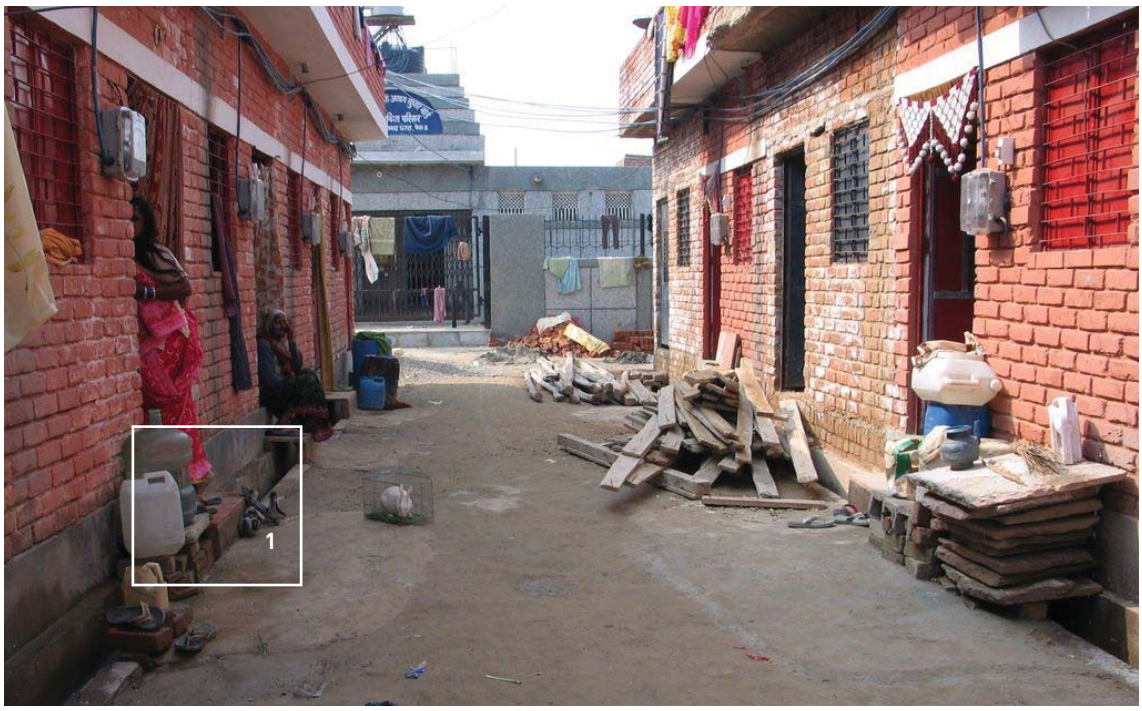


Image 3.4.5 (top), 3.4.6 (bottom) INCREMENTAL TRANSFORMATION OF AKT HOUSES. Image 3.4.5 (2011 February) and 3.4.6 (2011 December), taken just under a year apart, offer an insight into the types of incremental upgrades occurring in Savda Ghevra, and in particular to the AKT Street. (1) To step over the existing grey water drains (part of the planned infrastructure) that run along the front of the houses, residents often use leftover concrete 'u' sections as steps. More elaborate versions include benches or platforms for sitting, sleeping, or working outside. (2) Most families have decided to get rid of their window and instead installed a cooler over the benefit of light or the possibility of natural ventilation; (3) Rather than wait for the municipal services to pave the roads many houses have laid a thin concrete screed in front of their homes. With more water available interiors can now be cleaned with water. The unpaved roads, essentially loose sand and gravel become muddy with this increased water. (4) As washing and cooking have gone inside and upstairs many families have retrofitted the first floor terrace to accommodate this in the form of more enclosed space and more roof coverage. Some have cut a hole through the slab and run a pipe into the grey water drains to get rid of the waste water generated from these activities.

3.4.4 THE WATER KIOSK

The borewell project enabled shared access to water for one group of families. However, the ground water in Savda Ghevra is so polluted that the water extracted by the borewells in the area is not used for drinking purposes which leaves most families still dependent on tankers for drinking water. It was following this project, and in response to many residents desire for alternative and more convenient drinking water sources, that CURE began their next water project. Working with the financial aid of the Sir Dorabji Tata Trust (SDTT) – and based on a scheme they supported which pioneered the concept of a 'water kiosk' in rural areas - CURE developed a proposal to replicate this model in Savda Ghevra. The result was a kiosk run by a family headed by the matriarch, Bharvari Devi.

The kiosk (image 3.4.7) operates from a standard two-storey *pucca* house in 'O' Block. The ground floor contains the filtration (3x2m in area) plant that receives and cleans water pumped from the ground. The water is then dispensed most commonly into plastic containers at a cost of 10 INR (10p) for a 20-litre bottle. For an area where the average monthly income is 4500 INR (£44)[2] this is not cheap - even if only for drinking purposes - when compared to the DJB tanker which is free. When the kiosk was first set up the inhabitants imagined it more like a shop where one would come to collect water[3]. However, carrying water for general consumption is hard work and as the use of the filtered water became popular so too did the demand for a home delivery service. At this point Bharvari Devi's son, fresh out of school, bought a cart and he now offers, for an additional fee, a delivery service.

Image 3.4.7 WATER KIOSK AND FILTRATION SYSTEM. This is an internal shot of the Water Kiosk showing the filtration plant.

The Water Kiosk sells at least 1,000 litres a day, approximately 10,500 INR (£103) a month. The model deployed here is a small -scale local private extraction, treatment and delivery system; owned and managed privately to the benefit of the wider community. With no structure to regularise or monitor this (and the absence of any state legislation) the Devi family are starting to face competition as other families and NGOs set up more kiosks (such as the second kiosk set up by CURE in the Core House described in Chapter 3.2).

The unchecked extraction of valuable groundwater, with no mandate or programme to replenish the aquifer, is compounding the problem of equitable access to water. The problem of over-extraction of groundwater, versus the right to extract water is explored by Ostrom and her research in California on common pool resources (Ostrom, 1990). Ostrom describes how "without a change of institutions, people in such a situation acting independently will severely over-exploit the resource. Over-exploitation can lead to destruction of the resource itself" (Ostrom, 1990, location 1604 of 4156). What Ostrom is dealing with, like what is found in Savda Ghevra, is that the collective benefit of a basic necessity, in this case water, is not enough to ensure the maintenance of that resource.

In addition to all the water problems residents were concerned with water prices. With the help of CURE a group established a water committee to ensure that the water from all the kiosks remains affordable and that the kiosk, and any new set-ups, continue to operate with a socially responsible agenda – maintaining a resource that can be shared. The committee acts very much like a regulatory body – and is formalised as the *Shudh Jal Ghar Samiti* (Pure Water House Committee) which currently has 15 members. The committee, in establishing a formal structure, is working to create a sustainable business model as Savda Ghevra changes and grows. To support this, a secretary has been appointed who is receiving help from CURE to formalise the group, and this has involved setting up a bank account. Following this someone was elected from the group to manage the finances, a treasurer, and other responsibilities have been assigned to officers appointed by the committee. The *Shudh Jal Ghar Samiti* is an attempt to answer the question of how the state, the market, and the community itself can sustain long term, productive use of natural resources with no centralised regulatory framework; so that the benefits of water provision can be shared amongst a larger group of active and inactive community participants.

What has emerged is that the installation of the plant has generated significant leadership from within the female community in terms of hygiene and health education campaigns explaining that paying for clean water is worth it in terms of the associated health benefits. Local female residents use community meetings and informal discussions to educate other residents sometimes aided by the presence of CURE. They do this because they realize that the better resources are managed, the better their lives will be for it. This opens up scope for further research to investigate whether improved access to water services generates or initiates the creation of increased social capital?

3.4.5 SHARED ALTERNATIVE WATER MANAGEMENT INITIATIVES

The management of water is one of the largest and most pressing concerns for residents in Savda Ghevra – not only as more water becomes available – but because the mismanagement of water (grey and black) is one of, if not the single, most pressing health threat to the residents. Current consumption patterns (the over-pumping of groundwater) and lifestyle practices (seeping private septic tanks) are contributing to the depletion and pollution of groundwater. This affects everyone, not just in Savda Ghevra but in the wider city as a whole. A classic example of where this mismanagement is played out is in the many parks planned by the Municipal Corporation of Delhi (MCD). Image 3.4.8 shows one such park, rendered unusable and permanently flooded with dirty water.

Image 3.4.8 A COMMON TRAGEDY. This is an image of a park covered with water (note: the photo was not taken during the monsoon).The water is a by product of the many grey water (which often contains black water discharge from private septic tanks) and storm water drains that lack proper run off. The result is that foul water accumulates and is often diverted to parks. The result is that the park acts as a *de facto* dumping ground for very dirty water which is left untreated eventually percolating into the ground. As a result large quantities of pathogens are seeping into the ground and contributing significantly to groundwater pollution.

Image 3.4.9 shows a shared response from the residents to this condition. The pit, located in 'D' Block Park is lined with sand bags and concrete and is used by residents in the area to get rid of their excess water (mostly cooking and cleaning waste water) which they carry in buckets and dump here. Whether or not the residents are aware of the problems associated with groundwater pollution, these techniques remain, given the circumstances, a sensible response, even if they are not a good way to deal with waste water disposal.

Image 3.4.9 SHARED WATER SOAK-AWAY. The pit maintains the park as a resource and deals with the problem of waste water by creating an informal space for the water to get dumped. However, the dirty water still pollutes as grey water is still full of pathogens and is left to percolate into the ground. West Delhi has a high water table so there isn't enough soil to clean this water before it seeps into the aquifer. The stagnant water is also a dangerous breeding ground for mosquitoes. However, what this initiative does show is a serious concern to make improvements and and inherent resourcefulness. The pit is lined and contained so maintaining the park space. Perhaps the residents don't know that grey water (washing and kitchen waste) is full of pathogens so might not understand that what they are doing is harmful. This is a response to the poor infrastructure but also a response to increased access to water which has simultaneously happened to population increases.

3.4.6 THE MOTHER DAIRY KIOSK

Both the water kiosk described in this sub-Chapter and Chapter 3.2 (the second water kiosk business in the Core House) were inspired by the Mother Dairy kiosk which is part of the urban fabric throughout Delhi, with the exception of slum areas. Much like a local post office (or the ubiquitous London corner shop) every enclave, cluster of houses, rich or poor will have a Mother Dairy kiosk (image 3.4.10).

Image 3.4.10 TYPICAL MOTHER DAIRY SHOP IN DELHI. The Mother Dairy kiosk is a milk shop which also sells other (mostly dairy) products produced by the Mother Dairy brand. Mother Dairy is the largest milk supplier in Delhi. In the mornings women can be typically seen with stainless steel containers which they fill up with milk which in some cases like this image are dispensed via automated machines.

In 2010 Savda Ghevra also got a Mother Dairy shop (image 3.4.11) located at the main entrance close to the bus stop. The shop sells fresh milk and butter in the morning and evening, closing during the day.

Image 3.4.11 MOTHER DAIRY SHOP IN SAVDA GHEVRA. The shop was installed by Mother Dairy Inc. at the request and with the permission of the MCD to serve all of Savda Ghevra.

The milk kiosk takes on a type of institutional value and contributes to the recognition of Savda Ghevra as a legitimate place. When speaking with a resident about the process by which she incrementally invested in her house she made the comment that she only made those financial investments when the Mother Dairy shop arrived as she perceived this arrival as legitimising the presence of Savda Ghevra, crucially, by the state (Saraswati, 2012). The arrival of the milk shop reduced the likelihood that the site would be demolished and so her investment into bricks and mortar would be safe.

3.4.7 SHARED STREETS AND INDIVIDUAL ROOFS

The review of the AKT project revealed one of the principal environments where sharing occurs in Savda Ghevra is the small lanes or *galis*. The lack of internal space, the dark and damp conditions inside the houses, and general conditions of deprivation push people into the streets. The following series of images (3.4.12,13 and 14) show the conviviality found in the streets of Savda Ghevra.

Image3.4.12 STREETS TO LIVE IN. In the foreground are two young girls playing on the street. They share this space with countless amounts of washing where lines are shared between houses as they criss-cross down the *gali*. In the background a group of women sit together conversing. This could be an informal meeting or simply a social gathering.

Image 3.4.13 STREETS TO ORGANIZE IN. Taken from the rooftop of one of the houses in the 'AKT street' this image shows a group of residents in conversation. In this case one of the women is complaining about one of her neighbours and is seeking to resolve a problem with the help of other residents. Generally, mostly women and young children can be seen in the streets during the day. Men are less present during the weekday as they work in the city.

Image 3.4.14 STREETS FOR BUSINESS. Savda Ghevra is full of little business such as this hair salon or small shops which are located in front of shops or in free space.

In the same manner that many activities happen in the street, roofs are a desirable addition to a home to cater for similar needs. An investment in a *pucca* house will open the valuable potential for roof spaces which in the summer months are commonly used to sleep in the open because houses are too warm. Building a roof space creates an opportunity to remove activities that are shared in the street and situate them in the home and thus make them more individualised (image 3.4.15 and 16).

This form of sharing is different to the example of water-management in earlier sections. What is involved here are the subtle adjustments of families living together on a *gali* and managing conflict in public. The water management projects require some form of institutional political or civic organisation; the interplay between isolated activities in house and street are far more informal arrangements.

Image 3.4.15 (Top) ROOFS TO LIVE IN. Roofs become important spaces for activities such as drying clothes, cooking and storing given how small the plots are.

Image 3.4.16 (Bottom) THE ROOF AS AN EXTENSION OF THE HOUSE. This image shows a woman on her roof tying bundles of wood together which are stored and used as kindle in the winter months. There is a toilet behind her.

3.4.8 CONCLUSION

This section speculates on the conditions and principles that encourage sharing and mutual responsibility. There is a shift in the horizon of involvement between a shared *gali* to a larger principle: the horizon of town / neighbourhood found for example when discussing water or sanitation. The sub chapter explored two things the inhabitants of Savda Ghevra share: polluted water and the difficulty of obtaining clean water. These are issues which lead individual families to recognise that they are all in it together, that they are involved in a 'commons'. The shared AKT borewell offers an example of community-led development to deliver a small-scale infrastructural improvement. Such engagement, on an infrastructural planning level, has proved successful in that the resources work as a self (community) managed initiative. Any disputes are dealt with by the women in the street; and CURE, as the assisting agency, has not had to intervene. So although CURE initially took on the role of arbitrator, helping the parties find methods to resolve disputes that arose, this has proved to be unnecessary as the parties all agree with the working rules.

The Water Kiosk (like the Mother Dairy milk shop) has an embryonic institutional structure that reflects its role as a shared resource, and in the case of the kiosk will help to facilitate its transformation into an institution which is capable of monitoring and enabling more long-term productive use of water with incentives such as groundwater recharging and more controlled pumping from the aquifer. What has emerged is that the installation of the plant raises the issue of decorum as women, in particular, campaign for the health and financial benefits of clean water.

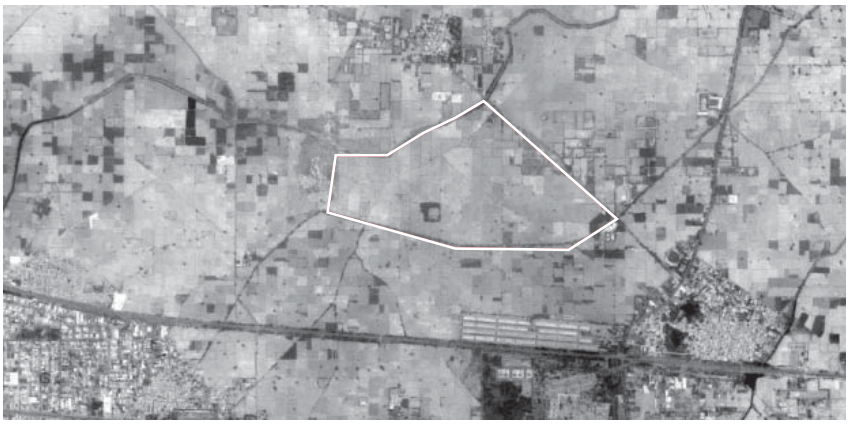
This part of Chapter 3 has reviewed the effect of material changes in the built environment on cultural changes in lifestyle and social behaviour. The specialisation of internal space has permitted new forms of socialisation to occur but has also hindered others. For example, the traditionally, very social of act of washing, when moved from being located in the communal space of the street to inside the home has accentuated individualised behaviour.

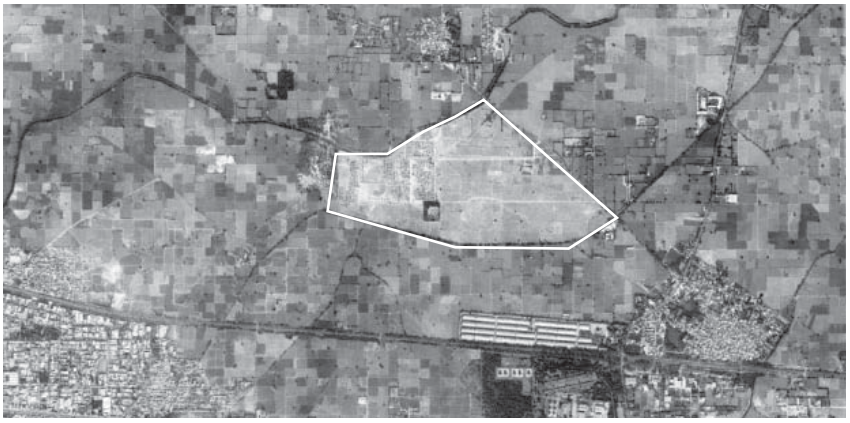
An intriguing question remains: what would have happened to Savda Ghevra if piped water had arrived at the same time as the new residents? Would this have removed the process of reconciling individual behaviour with collective necessities? Once these necessities are in place does this result in a drift towards the residents becoming 'middle class' when some needs and wants have become individualised? However, the arrival of piped water and sewerage did not turn for example, South Wales mining communities, into middle class neighbourhoods – how this is different is scope for further research. Regardless the topic raises a critical question in regards to sharing, does the process of engagement with middle class values and aspirations hinder sharing, and subsequently reduce opportunities for creating town within city? Or does this simply translate into other types of relationships?

3.5 INCREMENTAL: WHAT IS INCREMENTAL IN SAVDA GHEVRA

3.5.1 INTRODUCTION

The resettlement of previous slum dwellers to Savda Ghevra began in 2006 and by 2010 most of the families that currently live there had been allotted plots by the MCD[1]. The site still today remains only partially developed. When many of the original residents arrived in 2006 they found ex-farmland with nothing other than their demarcated plots. Images 3.5.1, 2, and 3 show how Savda Ghevra has gone from barren land to a relatively densely populated town. This indicates an inherent creativity, resilience and resourcefulness which, in a short period of time, has delivered what the state, and the formal sector have not.





Images 3.5.1, 2, 3 SAVDA GHEVRA CHANGING OVER TIME. These images show Savda Ghevra prior to resettlement in 2005 (top); soon after the first residents began to arrive in 2006 (middle) and Savda Ghevra 2011 (bottom), still only partially settled.

This sub-Chapter asks, how much of this development is incremental? How much of this development is being carried out by residents, as opposed to relying on government investment? What are the institutional state, and non-state, structures that support this, and how useful is this institutional process as a way of developing 'town'?

The resettlement being undertaken at Savda Ghevra does not involve the allocation of built houses, but simple relocation on semi-serviced plots with individual plots allocated on the basis of eligibility which are either 18 or 12.5 sq m (less than the size of a car parking space[2]). The plots are serviced with electricity but nothing else (no water, sanitation or structure). It is literally an empty plot. Each plot cost 7000 INR (£77[3]) for which the leaseholder gets a lease from the government for 10 years and then has the additional burden of having to build a home (occupy the plot) officially, although not in practice, within three months of resettlement.

Like other resettlement colonies (see following Chapter 3.6) the MCD produced standard plans and sections for houses which stipulate maximum dimensions and are meant to be indicative of a standard housing type (figure 3.5.1). The plans were procured (and then replicated) during an interview with the local MCD officer who revealed that none of the residents were supplied with the plans. On being questioned as to why the plans had not been shared, the officer remarked that the residents would "do as they wished anyway, so what was the point?"

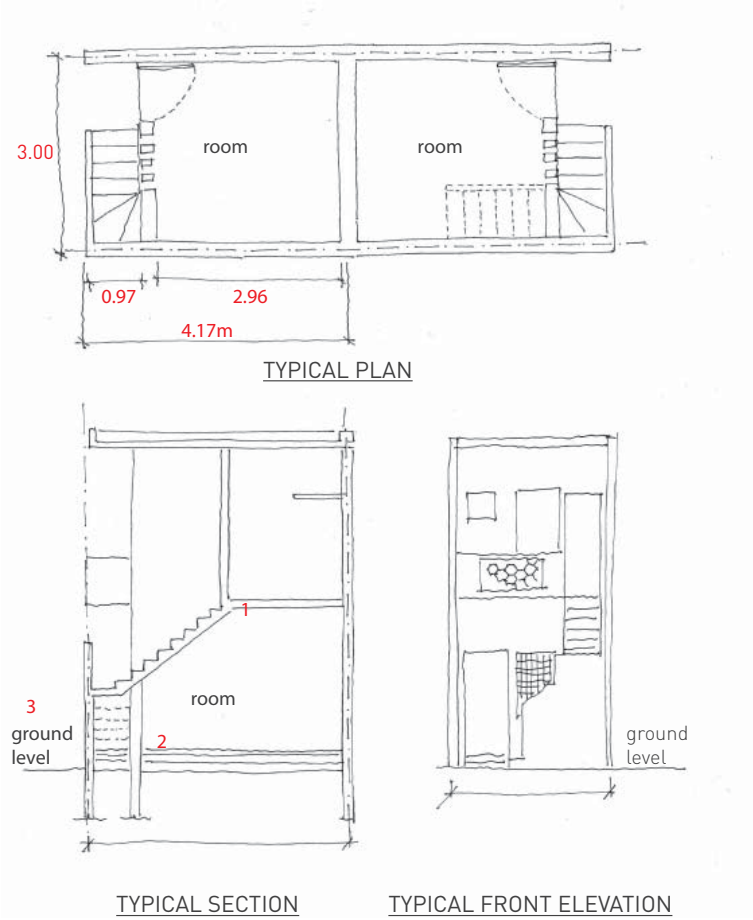


Figure 3.5.1 MCD HOUSING STANDARD. These plans and section stipulate a maximum building height of two stories with a permissible additional half structure on the roof, capping the building height to two-and-a-half stories.

1 RCC Slab
2 Floor finish
3 Lane (approx. 4m wide)

According to Ajay (Ajay, 2011), a local construction materials supplier, more than 90 percent of construction in Savda Ghevra is done by the people living there. Meaning the resident is controlling the process from design to procurement of materials and managing labourers. Residents build according to their means, only constructing when they have the money or materials. The result is a distinct type of housing characterised by locally-built, often poor quality construction, ranging from temporary one-storey houses to consolidated simple two-level-and-roof-terrace constructions that reflect the economic capacities of their inhabitants (image 3.5.4). There are currently what can be loosely described as three types of housing in Savda Ghevra - a categorisation that has been developed and adopted by researchers and NGO facilitators working in the area rather than a lexicon used by the residents: *Kuccha,* Semi-*pucca* and *pucca.* Houses made with temporary building materials such as bamboo and tarpaulin; houses with brick walls but corrugated tin roofs (i.e. cannot take loads); and houses made of reinforced concrete and load-bearing brick walls and roofs respectively.

Image 3.5.4 VARIATION OF HOUSES FOUND IN SAVDA GHEVRA. The assortment of house types is very varied. From left to right: a two storey *pucca* house with a half structure on the third floor, a single storey *pucca* house, a two storey *pucca* house complete with Corinthian columns, a *kuccha* shack, a semi-*pucca* room, a two storey *pucca* house and finally a two storey *pucca* house with a toilet on the third floor and shop on the ground floor. In this case the shop is selling small packaged food (crisps, cookies, and soft drinks), amenities such as shampoo sachets and the ubiquitous *paan*, a flavoured leaf which is chewed and later spat out, which is also sold in small sachets.

Such un-planned housing is referred to as 'incremental' in this thesis because this involves a process of dwelling where the residents move from one stage to the next through successive improvements and additions. The research examines the extent to which there is a correlation between the incremental upgrading of homes, and the physical and civic development of Savda Ghevra and the creation of a 'town'?

The Chapter will speculate on a local definition of incremental appropriate to the situation in Savda Ghevra, asking:

(1) Is there any form of construction (or destruction) that is not incremental?

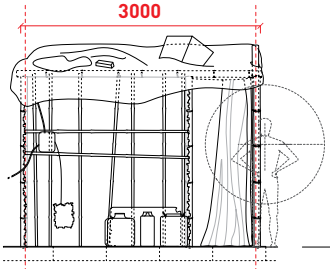
(2) What are the physical and social attributes associated with incremental change over a range of scales?

(3) How do multiple improvements result in the creation of 'town' and civic decorum through these improvements?

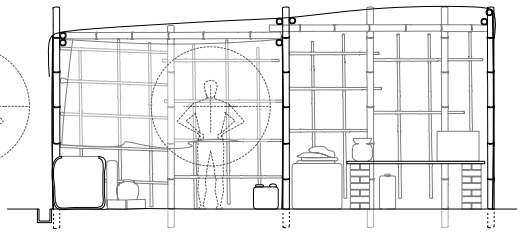
The review begins with single family dwellings where improvements provide both economic and social capital gains in return for the families' investment. This involves an urban savvy in terms of working with suppliers, builders, local authorities, NGOs and other residents. Some of the incremental changes involve the addition of shops, rental spaces, infrastructure (water, sewerage), the advent of civic decorum (no more defecating in public), and the articulation of a political voice in the form of the Resident's Welfare Association (RWA). The review ends with research moving up from the level of the house to the neighbourhood, where Savda Ghevra becomes recognisable as town-within-a-city, as the whole gradually acquires its own identity.

3.5.2 INCREMENTAL CONSTRUCTION

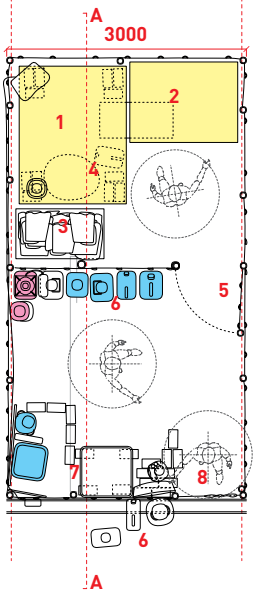
The following section will identify the types of housing found in Savda Ghevra exploring what are the physical attributes of the different types. The following figures are four houses which epitomise the variation shown in image 3.5.4: figure 3.5.2, a *kuccha* house; figure 3.5.3, a semi-*pucca* house; figure 3.5.4, a one-storey-plus-toilet *pucca* house and figure 3.5.5, a two-storey *pucca* house plus a toilet structure which is the legal maximum allowed in Savda Ghevra.



D-12 FRONT ELEVATION



D-12 SECTION A-A



D-12 GROUND FLOOR PLAN

1 Bed
2 Second Bed
3 Clothes storage
4 Storage underneath bed
5 Bamboo door
6 Water storage
7 Storage
8 Entrance

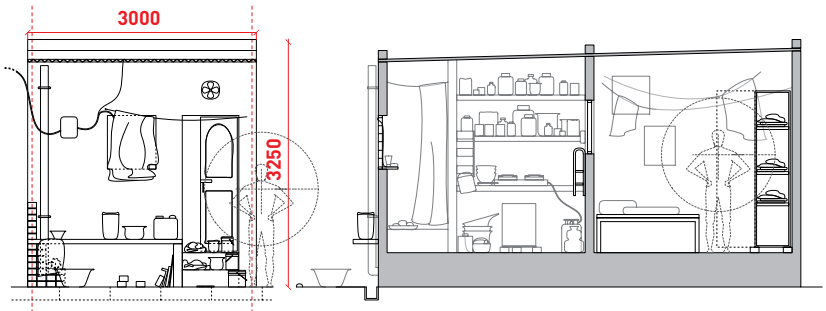
KEY

- Sleeping Area
- Cooking
- Water Storage
- Study
- Washing
- Sanitation

Figure 3.5.2 *KUCCHA.*

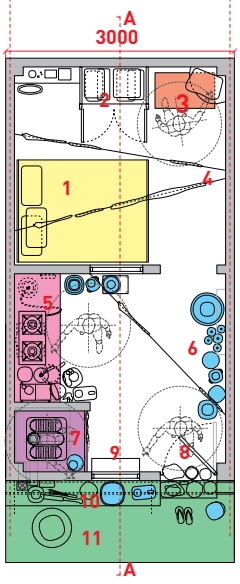
This family moved to Savda Ghevra in 2006 from Lakshmi Nagar, Delhi. There is no one who lives here who is in full employment. In the future they would like to make their house a *pucca* structure but will need to wait till they have a regular income. The residents use the community toilet but most defecate in the open and sometimes wash outside their house. Cooking and eating take place within the home. All washing and sanitation happens outside.

The roof is made from a plastic sheet held down with bricks and other found objects. The structural frame is made from bamboo placed directly into the ground which will not last more than one monsoon season. Cooking and eating takes place inside the home; washing and ablution happens outside. The house is effectively seen as a temporary measure to maintain ownership over the plot.



D-37 FRONT ELEVATION

D-37 SECTION A-A



D-37 GROUND FLOOR PLAN

1 Bed
2 Clothes storage
3 Desk and TV
4 Drying Clothes
5 Kitchen
6 Water storage
7 WC
8 Entrance
9 Window with toiletries
10 Bench with water storage
11 Washing platform

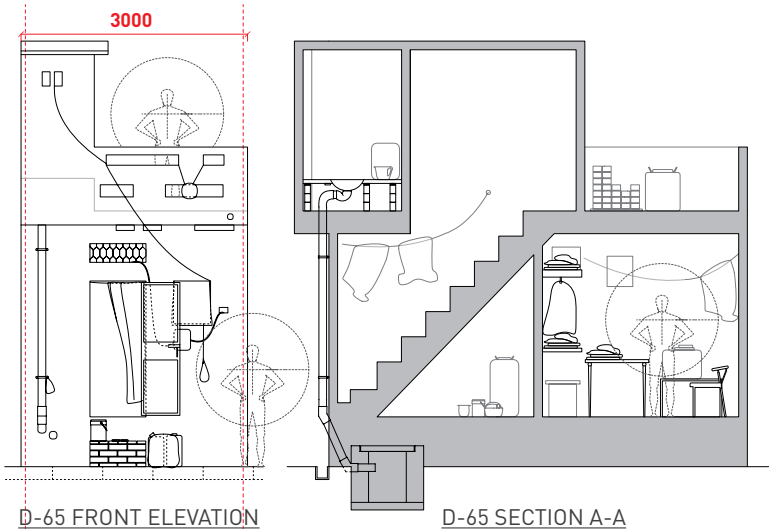
KEY

- Sleeping Area
- Cooking
- Water Storage
- Study
- Washing
- Sanitation

Figure 3.5.3 SEMI-*PUCCA*.

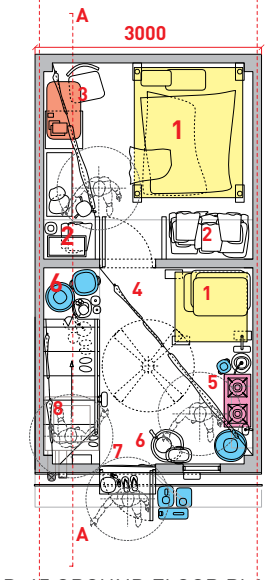
This family arrived in Savda Ghevra in 2006 also from Lakshmi Nagar, Delhi where they had been living for over 30 years. They initially built a *kuccha* house but when Devi became pregnant her parents helped finance a semi-*pucca* upgrade with a toilet. She works as a domestic worker and her husband as a labourer. They have built a concrete screed out front for washing, effectively encroaching on public land. They mainly cook and eat inside. During the summer months her husband sometimes sleeps outside.

This house is semi-*pucca* due to the fact that the roof is covered with corrugated steel sheets. This leaks and cannot sustain load on top. In order to upgrade a load bearing roof will be needed. Most houses have a hole for an exhaust fan which is a must for ventilation in 'slum' settlements. Electricity is free in the slum whilst here they have to pay. Families install them because they are used to it, a type of imported vernacular, however most do not run the fan as it is not affordable.



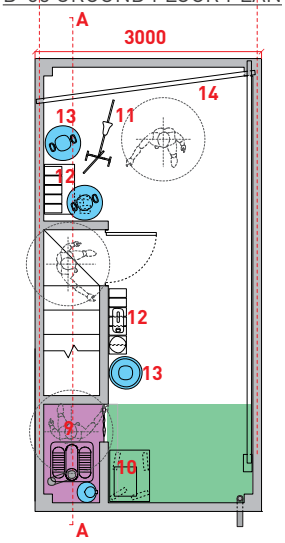
D-65 FRONT ELEVATION

D-65 SECTION A-A



D-65 GROUND FLOOR PLAN

1 Bed
2 Clothes storage
3 Desk and TV
4 Drying Clothes
5 Kitchen
6 Water storage
7 Entrance
8 Stairs to access WC



D-65 FIRST FLOOR PLAN

9 WC
10 Small generator (broken)
11 Bicycle
12 Bricks
13 Water storage
14 Clothes drying

KEY

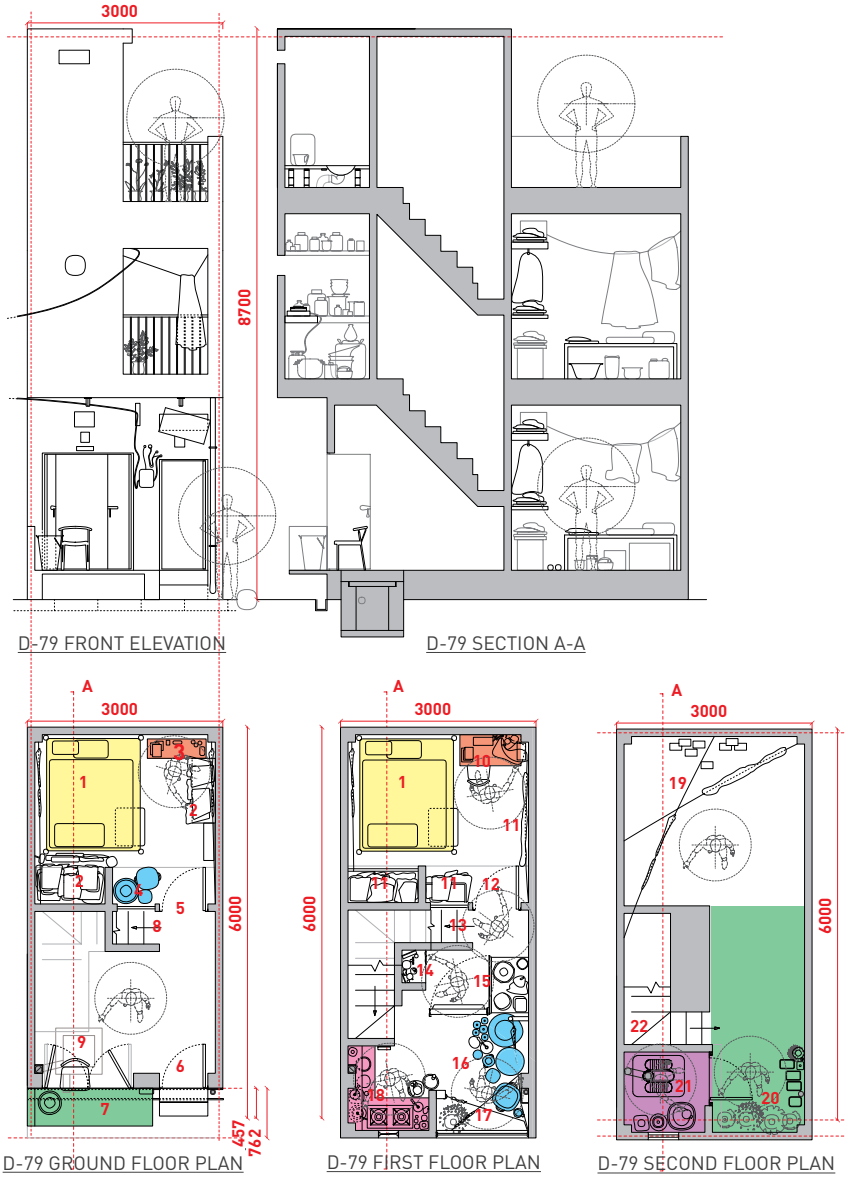
Sleeping Area
Cooking
Water Storage
Study
Washing
Sanitation

Figure 3.5.4 *PUCCA* 1.5 STOREY.

Although this family was allotted their plot in 2006 they didn't move to Savda Ghevra till 2008. Previously they had been living in Lakshmi Nagar, Delhi, for over 30 years in a *kuccha* house. Unlike their previous accommodation the family decided to invest in a *pucca* house because they legally owned the plot: an investment they made directly upon arrival.

Although nine people are living in a one bedroom apartment the family have invested in a toilet with a cesspit underneath the ground floor which requires regular cleaning (600 INR/ month) at a high cost rather than invest in more space. As a comparison one room can be rented for 700/month INR (£70) which is similar to what this family spend on cleaning the tank. With an upstairs space this means all washing can move onto the roof and keep the street clean. The roof structure has been constructed so that when the family have saved enough they can build another floor.

A half structure (i.e not a full storey) is built to accommodate the toilet typically placed at the front on a balcony or *chajjas* that overhangs sufficiently to run a pipe which connects with the tank located directly beneath, in the ground. This is the standard for the incremental construction of toilets in Savda Ghevra.



1 Bed
2 Clothes storage
3 Desk and TV
4 Water storage
5 Entrance to bedroom
6 Entrance
7 Outside platform
8 Stairs to access 1st floor
9 Septic tank underneath floor
10 Desk with TV (no. 2)
11 Clothes storage
12 Entrance
13 Stairs to top floor
14 Prayer space
15 Fridge
16 Water storage
17 Clothes drying
18 Kitchen
19 Clothes drying
20 Plants
21 WC
22 Stairs

KEY

Sleeping Area
Cooking
Water Storage
Study
Washing
Sanitation

Figure 3.5.5 *PUCCA* 2+. Like the other families they arrived from Lakshmi Nagar in 2006 where they had lived for over 30 years. Originally they lived in a *kuccha* house and in 2009 invested in this *pucca* house. The stairs have been placed so that they can easily add another floor when they have the finances. The ground floor is rented to an NGO which brings an additional income of 750/month INR (£74), much of which goes to maintaining the expensive tank which is connected to the toilet. Two storeys plus a third floor with a small structure, known as 2.5 storeys, is the legal maximum height for houses in Savda Ghevra. Although only 12% of houses have reached this stage of growth, almost all houses, once at this stage, incorporate some kind of *mandir* (prayer) space within the house.

There are three types of construction techniques used in Savda Ghevra to build the *pucca* houses – in order of price (and skill) - which support the *pucca* construction trade:

(1) masonry with steel and stone slabs (figure 3.5.6);
(2) masonry with reinforced concrete slabs (figure 3.5.7);
(3) masonry with reinforced concrete slab and columns (figure 3.5.8).

It is worth noting that all of Delhi is in a seismic zone. The only type that begins to have any seismic capability is the last, if done correctly. However, with all three there are general problems with construction: one of the principal problems seen was that the bricks are mostly of a poor quality and so absorb moisture. In addition the water content of concrete needs to be carefully controlled during the process of curing which is often not done properly. If the concrete is dried too quickly its strength is reduced. Reinforced concrete should be kept wet over a period of at least 14 days (cement reaches maximum hardness during 28 days in a laboratory) and needs water for all that time for the chemical process of hardening to proceed successfully.

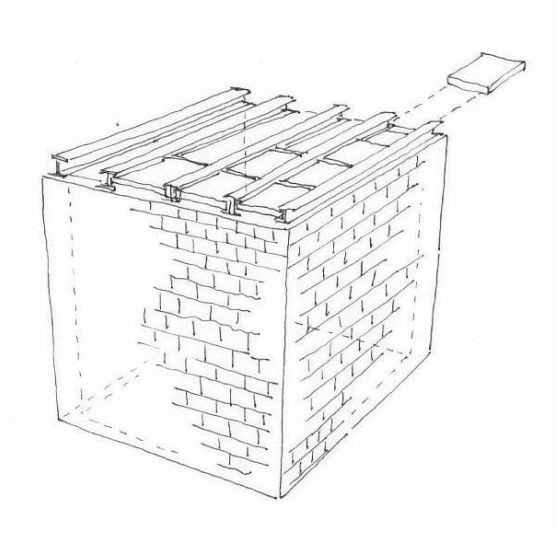


Figure 3.5.6 MASONRY WITH STEEL AND STONE SLABS. I-beams spaced at typically half meter intervals are placed on top of load bearing brick walls. The stone slabs which are often cut to half meter widths are then slotted into the I-beams. On top of this surface a concrete screed is often, but not always, applied. This is a very cheap way of constructing a *pucca* house. The I-beams are often pre cut to include an overhang.

This type of construction is preferred by residents who will build their houses themselves although it requires the cooperation of at least two strong people so residents or friends will get involved. This type of construction requires little skill and knowledge in construction and also requires little labour.

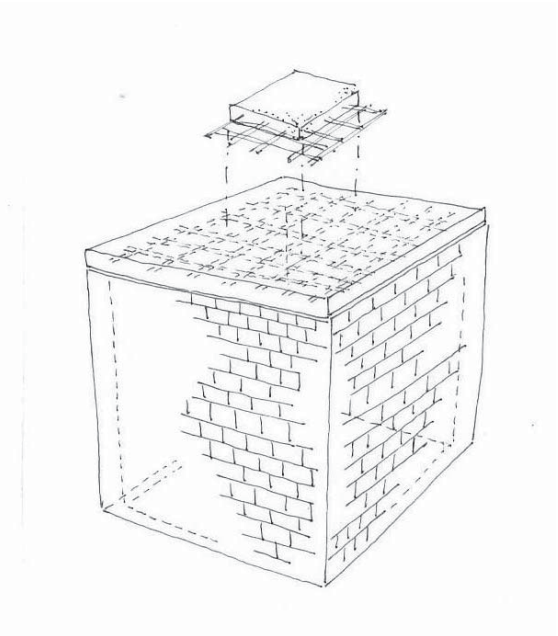


Figure 3.5.7 MASONRY WITH RCC SLAB. This version uses a similar brick wall construction to figure 3.5.6. Rather than using I-beams and stone slabs this method employs *in-situ* reinforced concrete. The concrete matrix is composed of sand, gravel, cement and water with reinforcement bars. Timber shuttering is used to make this type of construction.

Any construction using concrete tends to be carried out by contractors and / or requires the home owner to hire labour. Shuttering is also needed which for an individual family would be an added investment. Contractors tend to re-use shuttering for various projects so this is not a wasted investment.

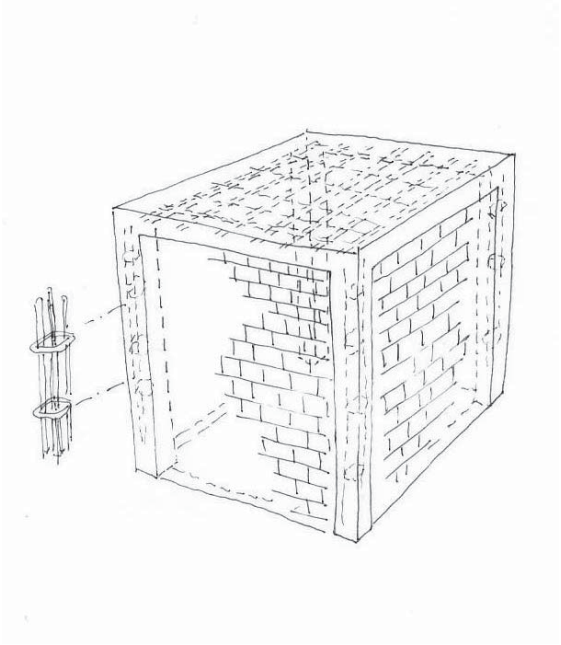


Figure 3.5.8 MASONRY WITH RCC SLAB AND COLUMNS. Not commonly found, unlike figure 3.4.6 and 7, the primary structure of this type is a reinforced concrete frame which extends into the foundations. Brick is used to in-fill the walls. The Core House design was based on refining this construction type. However, although it existed, the technology wasn't understood. For example, although these brick infill panels are not load bearing most bays are filled with brick walls because it is not understood that the concrete frame can support the imposed loads without the extra benefit of brick infill.

3.5.3 SURVEY OF (INCREMENTAL) HOUSE TYPES IN 'A' BLOCK, 1ST SURVEY

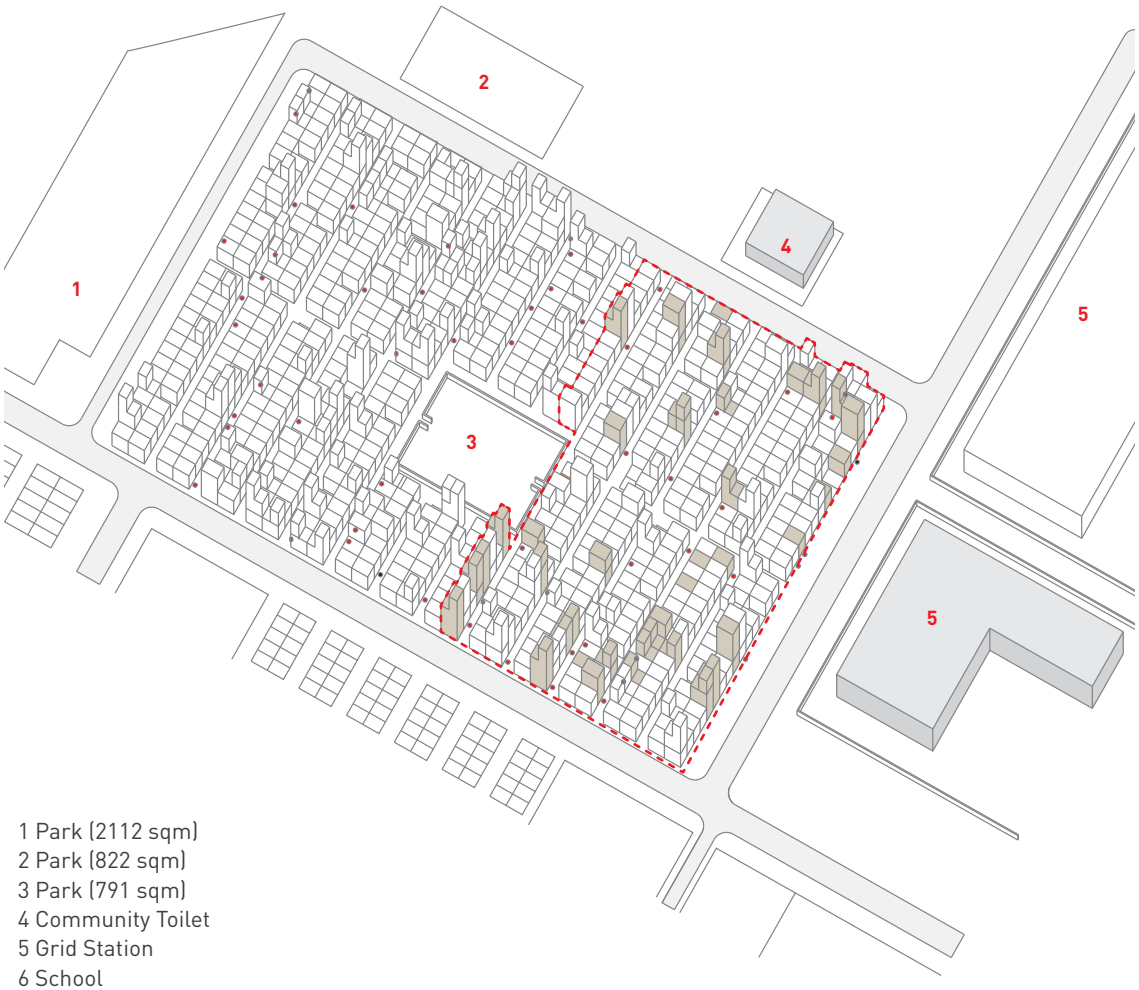
Site survey work intended to gain an understanding of the composition (or distribution) of these types throughout the site began in one block, 'A' Block (see map 3.5.1). This block was chosen because it was surveyed in 2008 (Jeffries et al, 2008) which provided comparative data. The survey covered 726 houses with a more detailed survey of 104. Although the study is based upon a relatively small sample size (in the context of all of Savda Ghevra) and hence does not employ rigorous statistical analysis, it was possible to highlight significant issues regarding the incremental nature of the development of the block that paves the way for further research.

Map 3.5.1 'A' BLOCK IN RELATION TO THE SAVDA GHEVRA MASTERPLAN. 'A' Block is located off the main commercial road of Savda Ghevra. The bus stop which connects Savda Ghevra with Mundka and Nangoli metro and train stations is located at the bottom right junction of 'A' Block and the main road. The residents that make up 'A' Block are originally Bengali and come from a number of different settlements, notably Yamuna Pushta, Lakshmi Nagar, Geeta Colony and Sultanpuri. 'A' Block was one of the first blocks to be settled in 2006 and 2007.

The 1st survey of 'A' Block recorded nine types of housing (figure 3.5.10) found in Savda Ghevra. In addition to *kuccha*, semi-*pucca* and *pucca* the survey differentiated types by the height of the *pucca* buildings - 1, 2 and 3 – for the number of floors. Because many houses often consist of only half a structure (image 3.5.5 and 6) which is usually a toilet structure, the survey also breaks down the type to 0.5 (storey) increments: *pucca* 1.5 and 2.5. The tallest type found in 'A' Block is three storeys. Finally there are categories for plots under construction and for empty plots.

Image 3.5.5 (top) and 3.5.6 (bottom). HALF INCREMENTS. Both houses are *pucca* with a half increment. The families have built a toilet structure on the first floor. A black water waste pipe can be seen to the front left of the house in both cases. The house on the right has lost half its living space on the ground floor to a shop so another room has been built on the first floor. The house to the left is occupied by one family so all living takes place at ground level. In both cases all washing and water-based activities happen on the first floor open to air space.

The following diagrams and charts show data collected during two surveys of 'A' Block spaced three years apart (2008 and 2011). The first visual shows 'A' Block and its immediate surrounding buildings.



1 Park (2112 sqm)
2 Park (822 sqm)
3 Park (791 sqm)
4 Community Toilet
5 Grid Station
6 School

House 2008

House 2011 / Extension

Houses with Toilets

Ammenity Buildings

Borewells

Handpumps

Area surveyed for toilets

Figure 3.5.9
AXONOMETRIC OF SURVEY. This axonometric drawing shows the number of stories which make up each house without distinguishing between *pucca*, semi-*pucca* or *kuccha*. The purpose is to show how much was built up in 2008 and how much has been built up between then and 2011.

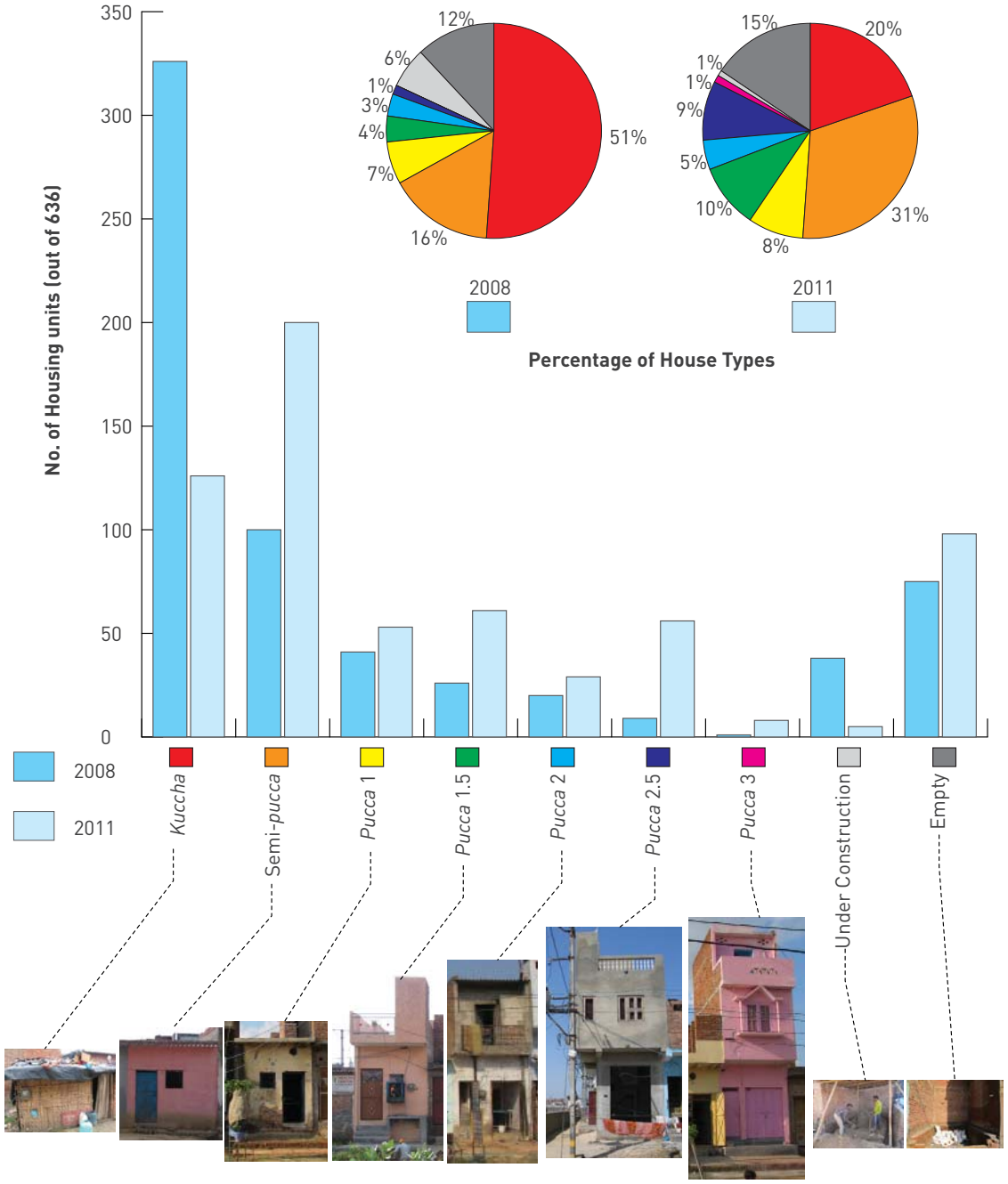


Figure 3.5.10
DISTRIBUTION IN NUMBERS AND PERCENTAGES OF HOUSE TYPES IN 2008 AND 2011. This diagram presents the same set of data as a numerical value in the bar graph and as a percentage in the pie charts. The data set reveals a series of points: (1) in 2011 there are more empty plots than in 2008; (2) There are significantly more *pucca* houses (especially 2.5 stories) in 2011 however (3) the majority of construction remains semi-*pucca* and (4) over 50% of construction is single storey. So although there is a significant reduction in *kuccha* houses the houses remain predominantly semi-*pucca* and crucially not load bearing structures capable of growing vertically.

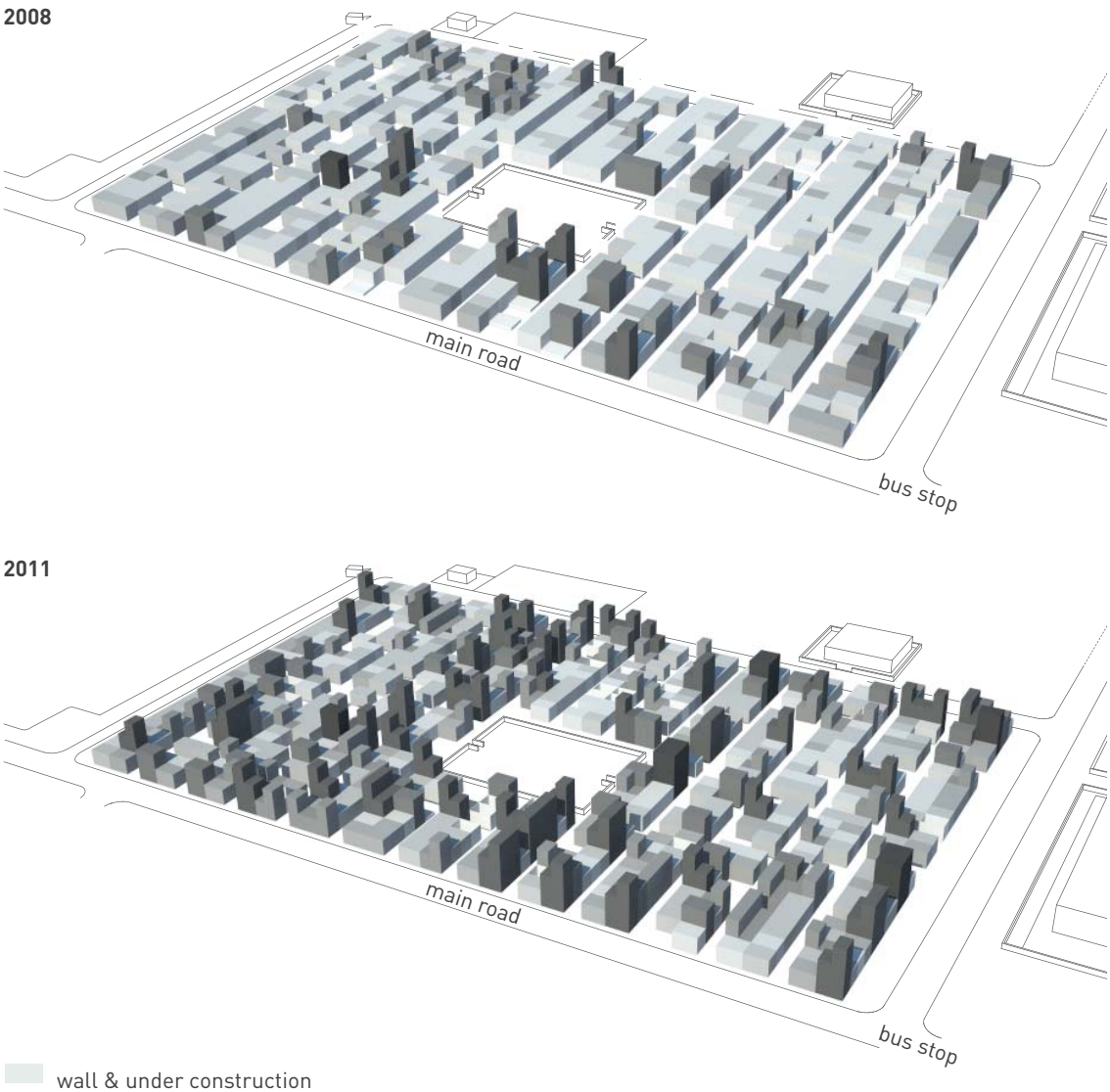
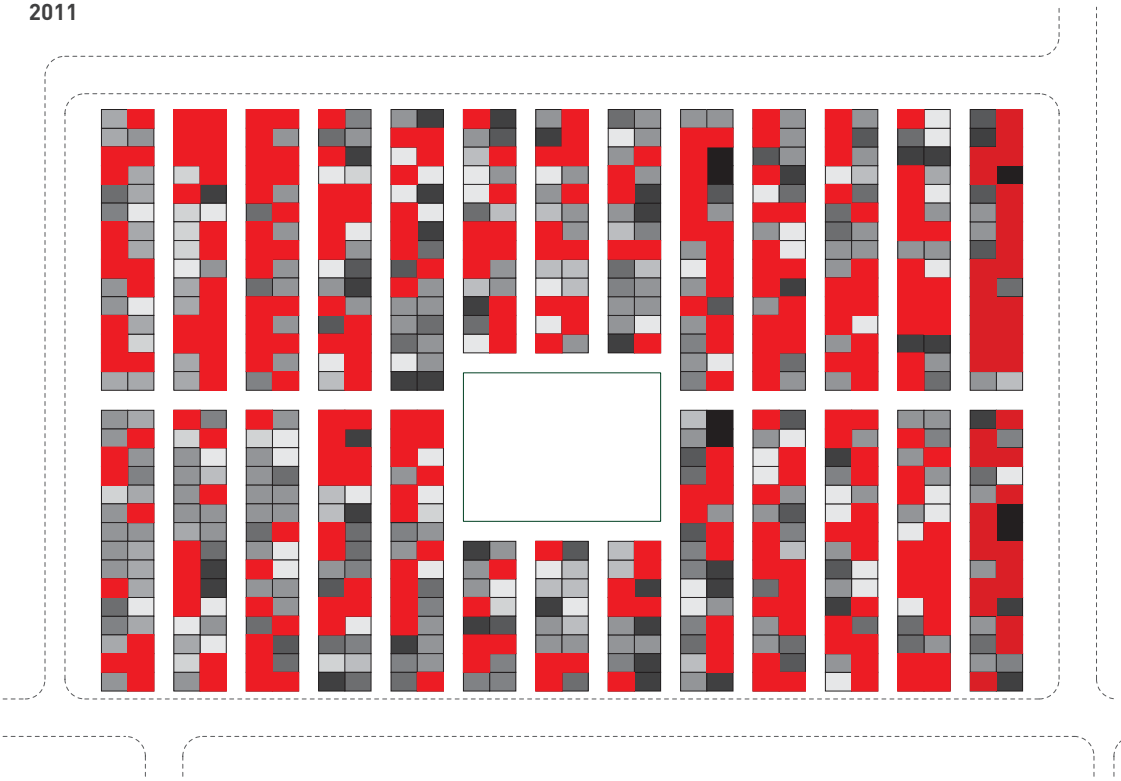


Figure 3.5.11
DISTRIBUTION OF HOUSING TYPES IN 2008 AND 2011 REPRESENTED AS A COLOUR GRADIENT. This diagram represents the data shown in figure 3.5.9 as a visual colour field with the lightest colour being empty and the darkest being *pucca* 3 storeys. Visually this looks positive with a considerable change in tone.

2011



Empty
Under construction
Wall structure
Kuccha
Semi-*pucca*
Pucca 1
Pucca 1.5
Pucca 2
Pucca 2.5
Pucca 3
No Change

Figure 3.5.12
PERCENTAGE OF HOUSES PERFORMING AN UPGRADE. Although figure 3.5.11 – as a visual colour field - shows plenty of positive investment this diagram shows the data for 2011 only in plan highlighting in red all those houses that did not make an upgrade between 2008 and 2011. This shows that approximately half the houses in Block 'A' have not made an upgrade during this period.

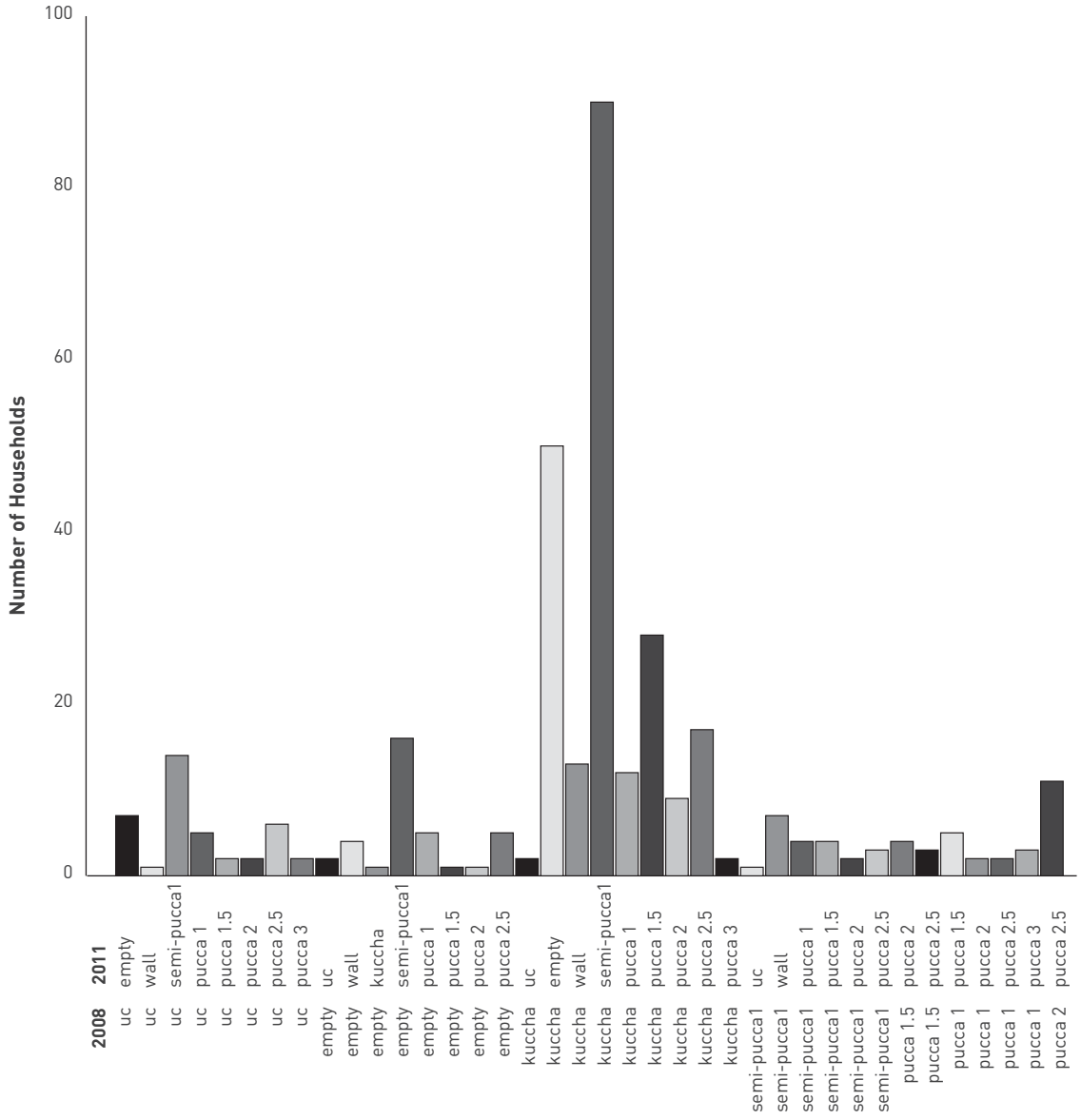


Figure 3.5.13 TYPES OF UPGRADE. This bar graph focuses on the types of upgrades made – i.e. those houses which had changed in figure 3.5.12 – looking at what changes were made. Predictably the overwhelming transformation was from *kuccha* to semi *pucca*. The second biggest change was from *kuccha* to an empty plot, indicating a large percentage of negative incremental change. Third and fourth were *kuccha* to *pucca* 1.5 and *pucca* 2.5 respectively.

3.5.3.1 'A' Block 1st Survey Conclusions

The diagrams imply a phasing that progresses in pulses – a lot of houses became semi-*pucca* before they became multi-storey. One would expect that more shops and rooms for rent would appear as the structures acquired more floors but this was not always the case. In many single-storey dwellings an aspect of the house or the space right in front of the house had been converted to run a small business suggesting income was more valuable than living space.

Other points to highlight are the high number of once *kuccha* plots which have been vacated. This suggests that these plots belonged to families that have given up on the idea of living in Savda Ghevra, but have not sold their plots and are most likely to have moved back into slums in the city centre. Because of this, migration back to new, or previous squatter settlements, which is estimated at 40% (CURE, 2010) has left the policy of slum demolition and resettlement to be questioned[4]. Not all of the residents who have given up on Savda Ghevra keep their plots, the re-sale of plots is a thriving market, despite being illegal under the lease agreement with the MCD. With little to no development of affordable housing in Delhi (and India generally) plots in Savda Ghevra offer a lucrative investment. An empty plot can be bought for about 10,000 INR (£100) and sold on for in excess of 300,000 INR (£3,200) if fully developed, according to local contractors and NGO workers (Pintu, 2011).

Survey work revealed some insight into the extent to which plots are being 'developed' in this manner. During interviews with contractors and material suppliers, it became clear that contractors in Savda Ghevra work on only about 10% of the housing stock (Ajay, 2011). Contractors tend not to work for the original re-settlers (i.e. resettled slum dwellers) but for families who have bought a plot on the black market either to live in, rent or for re-sale. In addition, contractors mostly build *pucca* houses that are two-plus-storeys (Pintu, 2011). The 10% figure is corroborated if we look at the percentage of top end *pucca* construction (figure 3.5.10): 1% for *pucca* three-storeys, 1% for 2.5 storeys and 8% for two-storeys amounting to 10% in total. This figure is equivalent to the 10% of house construction estimated to be done by contractors. If we take this 10% as an indicator of a re-sale, and add it to the 15% of people who are holding on to plots (i.e. empty plots), we can estimate from this data that 25% of the intended original population are not actually living in Savda Ghevra and this doesn't take into account plots that are occupied by renters.

There is a lack of evidence indicating whether or not residents are selling up and moving back to Delhi. It is also unclear whether this would indicate a move out of poverty towards being middle class, or a return to marginal slum living. It is hard to collect data to support either claim, mostly because of the illegality of the re-sale of plots. The survey does show however, that what might seem to be a steady additive process is not always so. Incremental upgrades are not guaranteed and indeed sometimes reverse at the early stages – there is clear evidence of both positive and negative incrementalism. So although the state has granted land titles which have encouraged investment in building homes, the construction of good quality *pucca* dwellings only represents 12% of the housing stock. A tentative conclusion could be that the financial burden of the cost of resettlement without access to work makes such an investment unaffordable.

3.5.4 COMPARISON OF 'A' BLOCK AND 'M' BLOCK, 2ND SURVEY

Because 'A' Block, and Savda Ghevra in general, do not consist of one homogenous group of people, survey work was also conducted in 'M' Block to serve as a comparison (map 3.5.2). 'M' Block was chosen because, like 'A' Block there was data from 2008 (Jeffries et al, 2008) and it was also settled in 2006-07; but unlike 'A' Block, 'M' Block is composed of predominantly one group of people, resettled from one slum cluster close to the international airport.

Map 3.5.2 'M' BLOCK IN RELATION TO THE SAVDA GHEVRA MASTERPLAN. 'M' Block is the first block seen upon entering Savda Ghevra from the main road that leaves New Delhi to the west. It is composed of residents who used to live in slum clusters around the old Delhi airport and who were relocated to make way for the new airport, the flagship architectural project for the 2010 Commonwealth Games.

The residents came from a settlement that resembled more an urban village than a 'slum'. On the basis that these families were living on ancestral land acquired by the airport authority, the airport colony residents formed a group prior to resettlement and aided by numerous NGOs, to contest their resettlement. One of their primary concerns was the loss of work since most of the airport colony residents worked in the airport. A deal was struck which involved a direct transport link between Savda Ghevra and the airport, which, at the time of resettlement, was the only direct transport connecting Savda Ghevra with the city. Other demands included the paving of the roads and drainage. Till 2013 'M' block was the only block which was completely paved, had complete grey water drains and a functioning community toilet block.

Using the same survey techniques to identify and visualize the housing types in 'A' Block the following diagrams represent the findings in 'M' Block:

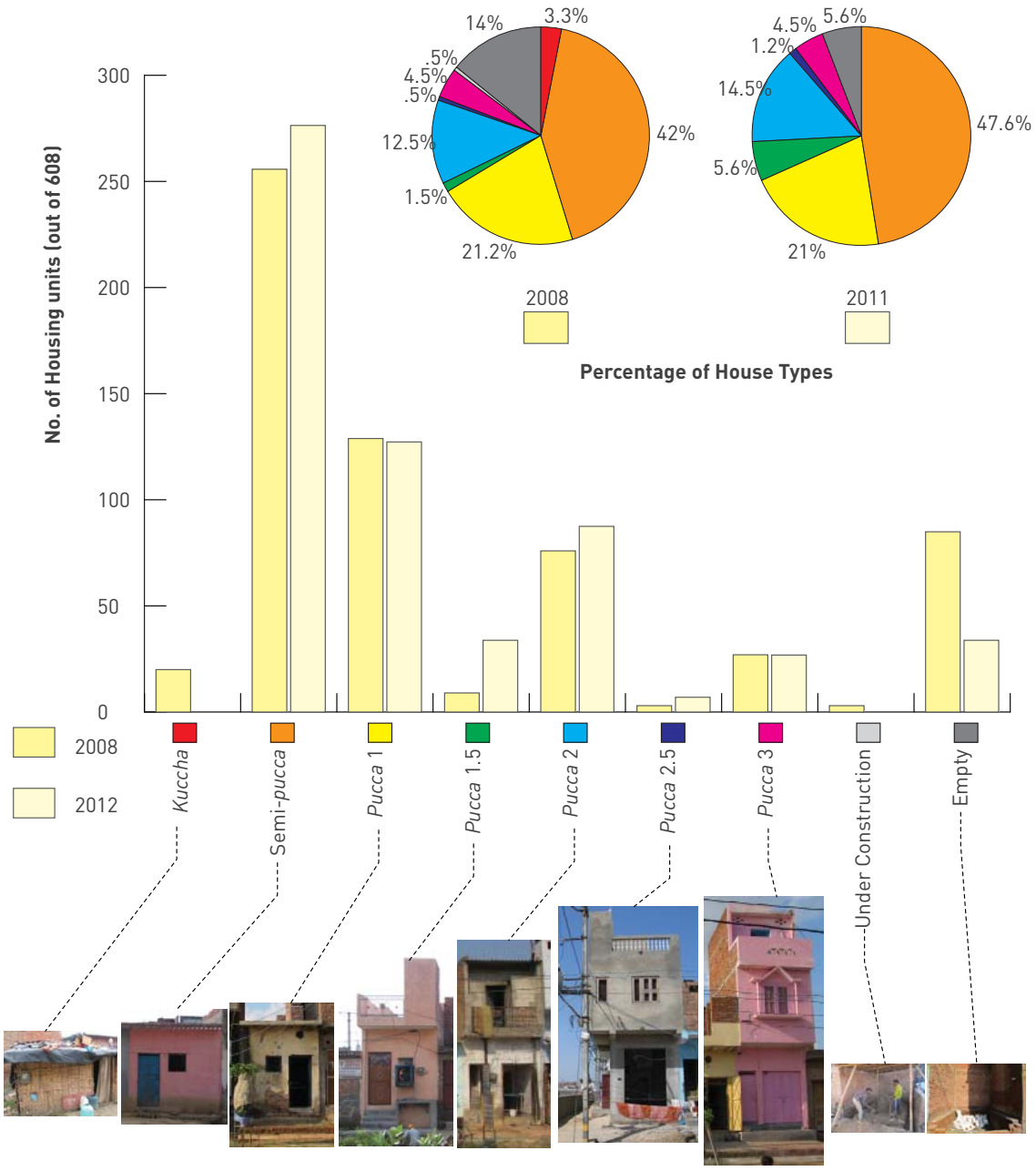


Figure 3.5.14
DISTRIBUTION IN NUMBERS AND PERCENTAGES OF HOUSING TYPES IN 2008 AND 2011, 'A' AND 'M' COMPARISON. This diagram presents the same set of data as a numerical value in the bar graph and as a percentage in the pie charts. Unlike 'A' block there has been very little change over the years, a sign of few incremental improvements. The other

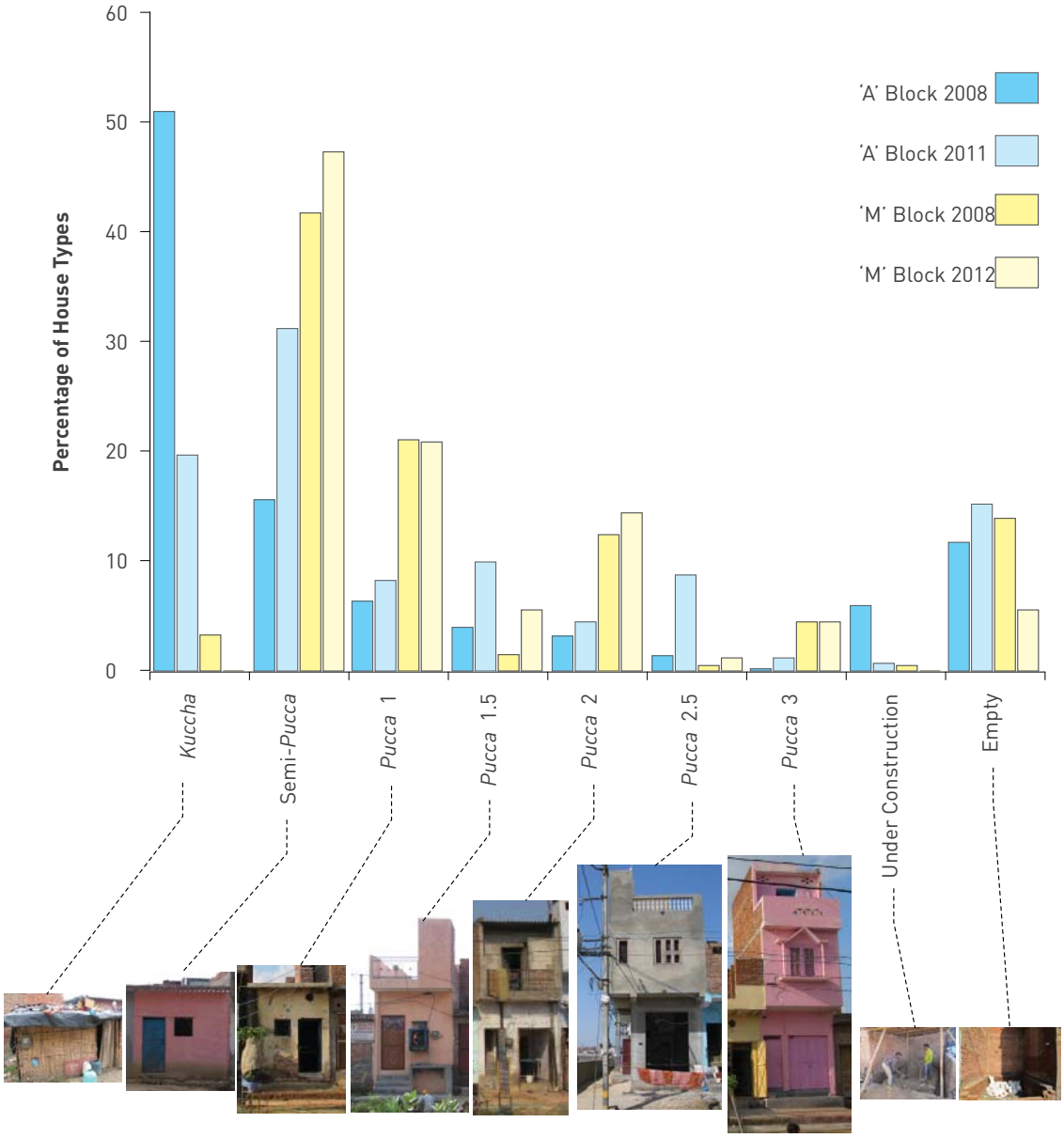


Figure 3.5.15
COMPARISON OF HOUSE TYPE DISTRIBUTION (%) BETWEEN 'A' BLOCK (BLUE) AND 'M' BLOCK (YELLOW). This figure shows the two sets of data side by side showing, in darker tones, the data collected in 2008 and in lighter tones the data collected in 2011 and 2012 respectively. As already noted, in 'A' Block there were a significantly higher number of *kuccha* houses than in 'M' Block. In both Blocks, the number of semi-*pucca* houses and 1.5 storey houses increased, whilst the quantity of *pucca* construction remained the same. 'M' Block has a much higher percentage of two-storey and three-storey structures. Unlike 'A' Block there was less visible sign of ongoing building construction (particularly when compared with the 'A' block data for 2008) and fewer empty plots.

3.5.4.1 Comparison of 'A' Block and 'M' Block 2nd Survey Conclusion

What the data presented in the above charts and graphs does not expose is the ambiance of the two blocks, revealed by walking around and spending time there. 'A' Block is a dynamic and vibrant cluster of houses with shops, hair salons, and even an arcade games room (image 3.5.9). By contrast, 'M' Block is quiet with fewer people on the streets and fewer shops. Many houses, according to the residents, seem to be secondary homes, perhaps of families holding on to their investment but not living there. Interviewed residents described that many of the men who have homes in 'M' Block actually live, from day-to-day, in slums close to or on construction sites closse to their work. They prefer this to doing the long daily commute to the airport and back. Images 3.5.7 and 8 show the difference 'A' Block and 'M' Block respectively with two shots taken at mid-day along a typical street.

Image 3.5.7 DYNAMIC STREET LIFE IN 'A' BLOCK.

Image3.5.8 EMPTY 'M' BLOCK.

The comparison between 'A' Block and 'M' Block reveals a significant difference in both physical landscape and inhabitation of that landscape. This provokes further questions and suggests some tentative answers and conclusions. For example, could the lack of *kuccha* housing in 'M' block be an indication of a higher purchasing power of the residents of 'M' Block? Based on interviews with residents and NGO workers, unlike most other blocks, all the residents in 'M' Block retained their jobs at the airport which could explain this. However wouldn't a secure income be a greater stimulus to capitalise on home-construction? Yet, unlike 'A' block, there has been little incremental investment in homes, past the initial stages.

In 'A' block families and, in particular women, described the importance of investing in a permanent home, with their aspirations being that Savda Ghevra will become a prosperous community; even an arcade room has cropped up (image 3.5.9). By contrast, 'M' block residents describe their homes as a stop-gap to something better. In this sense 'M' Block resembles a dormitory (or transitory) town – a place where people sleep but work elsewhere. Does this suggest that incremental additions are better suited to neighbourhoods / clusters where people work and live?

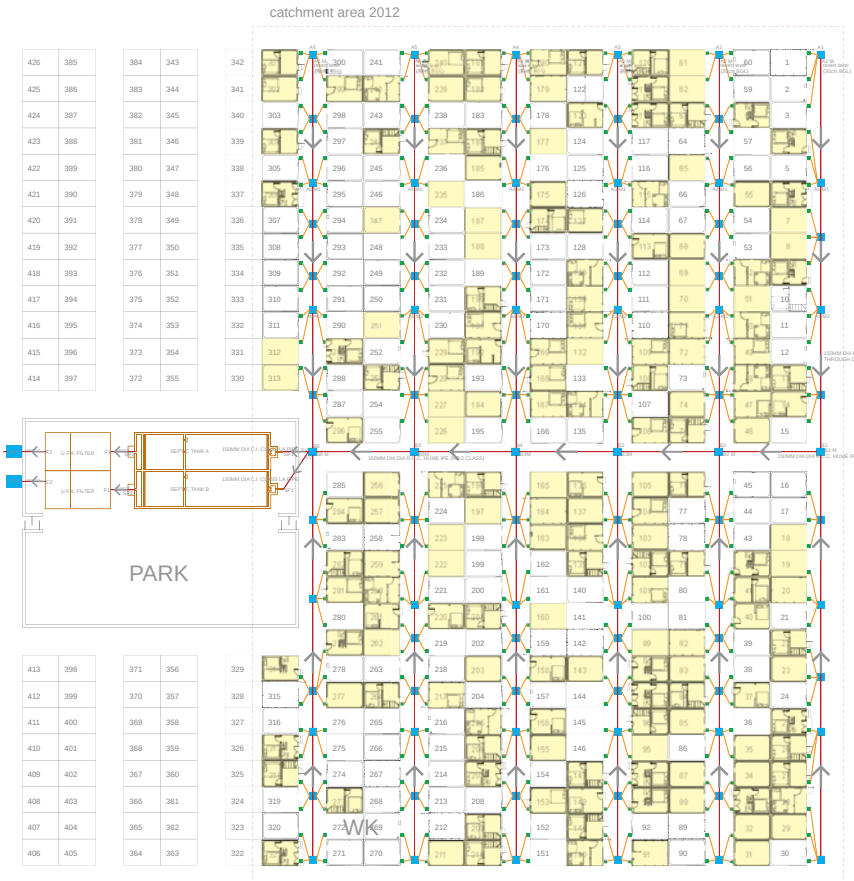
Image 3.5.9 AMUSEMENT ARCADE HOUSE. The incremental approach to housing encourages alternative short term uses during the interim stages such as in this house where the ground floor has been converted into a games room which generates an income.

And if 'M' Block does resemble a dormitory town, are the residents waiting for a time to return to Savda Ghevra and then invest in their homes? And, if so, is the 'myth of return' an impediment to incremental improvements? Or has this group taken for granted their economic security and begun dreaming of entering the capitalist housing-market in the city centre? This is the subject of reflection in the concluding Chapter 4 and an opportunity for further research.

3.5.5 THE ANATOMY OF INCREMENTAL TRANSITIONS, 3RD SURVEY

During all survey work a key transition was identified: as families invested in a *pucca* multi-storey house they also added a toilet (as seen with the Benagli family, image 3.3.2 Chapter 3.3.2). During community consultation many residents said that often such an investment would be triggered by a daughter coming of age, or a bride entering into the family home, with an in-house toilet being very important in terms of the families dignity and aspiration.

In this sense the transformation undertaken by the Bengali family is a narrative of the changes occurring in domestic and public culture which happen alongside the process of house construction. The vertical growth of the house transforms the way the residents of the house relate and behave: in 2010 the family would wash outside and defecate in the field; whilst in 2011 all these activities have moved into the house. To explore this relationship between vertical incremental growth and sanitation and water supply, further survey work was done by the author. Called the 'Housing and Infrastructure Survey' (the 3rd survey) this covered 172 households (map 3.5.3) out of the 321 that fall within the catchment area of the Sanitation Project (Chapter 3.3) in 'A' Block. The focus extended the investigation from identifying a house type to including whether the house had an individual toilet (with a pit), a borewell for water, an overhead tank for water storage and also the number of residents. The research was conducted to see if there was an association between incremental growth and investments in water supply and sanitation.



Map 3.5.3 HOUSING AND SANITATION SURVEY. The survey was carried out within the catchment area (red dotted line) of the Sanitation Project (Chapter 3.3). The 172 households surveyed are highlighted in yellow. These were not chosen but simply reflect the fact that there was someone at home who could answer the questions when the survey was conducted. In addition, because the survey was conducted mid-week, during the day, the respondents were mostly women.

Out of the 172 houses surveyed, 18 (10%) had upgraded since the previous year when the data collected in 2011 for 'A' Block was recorded. Out of those that upgraded, seven (35%) included a toilet. Out of the total of the 172 houses surveyed, 140 were primarily domestic dwellings, excluding plots that are under construction, empty, or used as a shop (or similar). Out of the 140 plots where families reside 58 (40%) have toilets. In total out of the 172 plots surveyed 63 (36%) had toilets of which 30 (46%) were built two or more years after resettlement in 2006-07. Out of the 140 houses occupied the average number of occupants per plot was 4.9, in line with the average of five for Savda Ghevra as a whole. However, for houses with toilets, the average family size increased to 5.6.

It is hard to draw definite conclusions from this data – it would be naïve to suggest that what is a positive causal relationship between the average family size residing in a plot, and the desire for a toilet, is indicative of large families needing or wanting a toilet. However the addition of a toilet must surely facilitate provision for a larger family and would certainly help attract a bride into the home. The decision to invest in a toilet emerges as a key threshold in the process of incremental house improvement.

3.5.6 CONCLUSION

Incrementalism, and the resulting making-a-town-from-houses, identifies dwelling as something always in the making. It commands a particular kind of thinking and is the product of a specific practice (often unstable and precarious) that informs how people, things, places, and infrastructure are made and used. The survey explores how residents work both as individuals and together – how connections are made – asking the research question 'How incremental is Savda Ghevra, and what does incremental look like?' The empty plots littered around Savda Ghevra several years after relocation are an indication that the policy of resettlement has failed the families to which they were allocated. However, on the other hand, the upgrades and overall state of Savda Ghevra shows how, in five years, with little to no assistance great improvements have been made by those who have taken up residence and invested in their built environment. The incapacity of the state to develop the land has highlighted what the residents have been able to do with their scarce resources. The surveys provide a glimpse of what it takes to address the enormous challenge of housing provision for low income groups, highlighting the commitment involved from the residents to provide for themselves a better way of life and the difficulties associated with resettlement.

At each stage of incremental growth a series of thresholds were revealed which expose the relationship between risk (income) and surplus. A tentative conclusion can be drawn from the surveys reviewed in this section that, in this context, incrementalism is best suited for semi-*pucca* houses through to two-storey structures that are built and managed by the homeowner. However to start the incremental process of additions and improvements, some form of surplus, or access to finance, is required. It is hard to draw specific conclusions as to why so much of the housing stock remains *kuccha* today in Savda Ghevra. Unlike inner city *kuccha* slum clusters there is some form of tenure security in Savda Ghevra which would reduce the risk of demolition, and ideally incentivise housing investment. However, the short term of the lease, general hardship, lack of access to work and the disconnected and peripheral location could encourage perceptions of it being a stop-gap, temporary home. In this case residents might aspire to sell the plot and move back to the city. Other impediments to growth are that the plots are small, thus limiting opportunities such as additional space for rental income, or for a shop or a place for some other form of income-generating activity.

Although income-generating activity is possible through vertical growth, for a resident to confidently invest, a reduction in the risk of eviction is required. This can be provided by positive long-term tenure arrangements. In the case of Savda Ghevra this could take the form of extending then ten-year lease, or by increased state investment in infrastructure projects and other services such as milk dispensaries, banks, sanitation, water and other community structures. Increased space, confidence and surplus often results in the inclusion of a toilet in the home. The addition of a toilet facilitates larger family sizes, as it supports an extended family structure, which in turn is cost-effective, increasing surplus and the potential for more incremental investments.

Based on these findings there is more scope to examine the extent to which collective necessities such as sanitation and water supply can be provided by a process of incremental improvement in peri-urban, disconnected settlements which are receiving little or no state support. Furthermore it would be interesting to discover to what extent such a process of incremental infrastructural improvement might be related to the incremental stages and thresholds identified above. The next stage in this Chapter is to examine the extent to which sharing has helped to make these incremental transitions. These questions are discussed and reflected upon in the concluding Chapter 4. But first we examine the history of two older resettlement colonies, Dakshinpuri and Kalyanpuri, which are sited nearer the centre of Delhi and Bawana, a contemporary case study. The historical sites offer an idea of what Savda Ghevra can potentially become and the parallel challenges faced whilst Bawana compares the challenges of self build against a delivered, prescribed apartment with no possibility for incremental growth.

3.6 WHAT IS INCREMENTAL IN BAWANA, DAKSHINPURI AND KALYANPURI

3.6.1 INTRODUCTION

To help with the task of answering the question: what does 'incremental' mean in the context of creating town-from-houses in Savda Ghevra, this Chapter compares Savda Ghevra with three other resettlement colonies: Bawana, Dakshinpuri and Kalyanpuri. Bawana, like Savda Ghevra, was established in 2006, but offers apartments with no room for incremental improvements. Dakshinpuri and Kalyanpuri offer an insight into the historic processes, which lead us to ask 'why?' and 'how?' people have ended up in site-and-service resettlement colonies, on the urban fringe[1] of Delhi, like Savda Ghevra, and what can we learn from them.

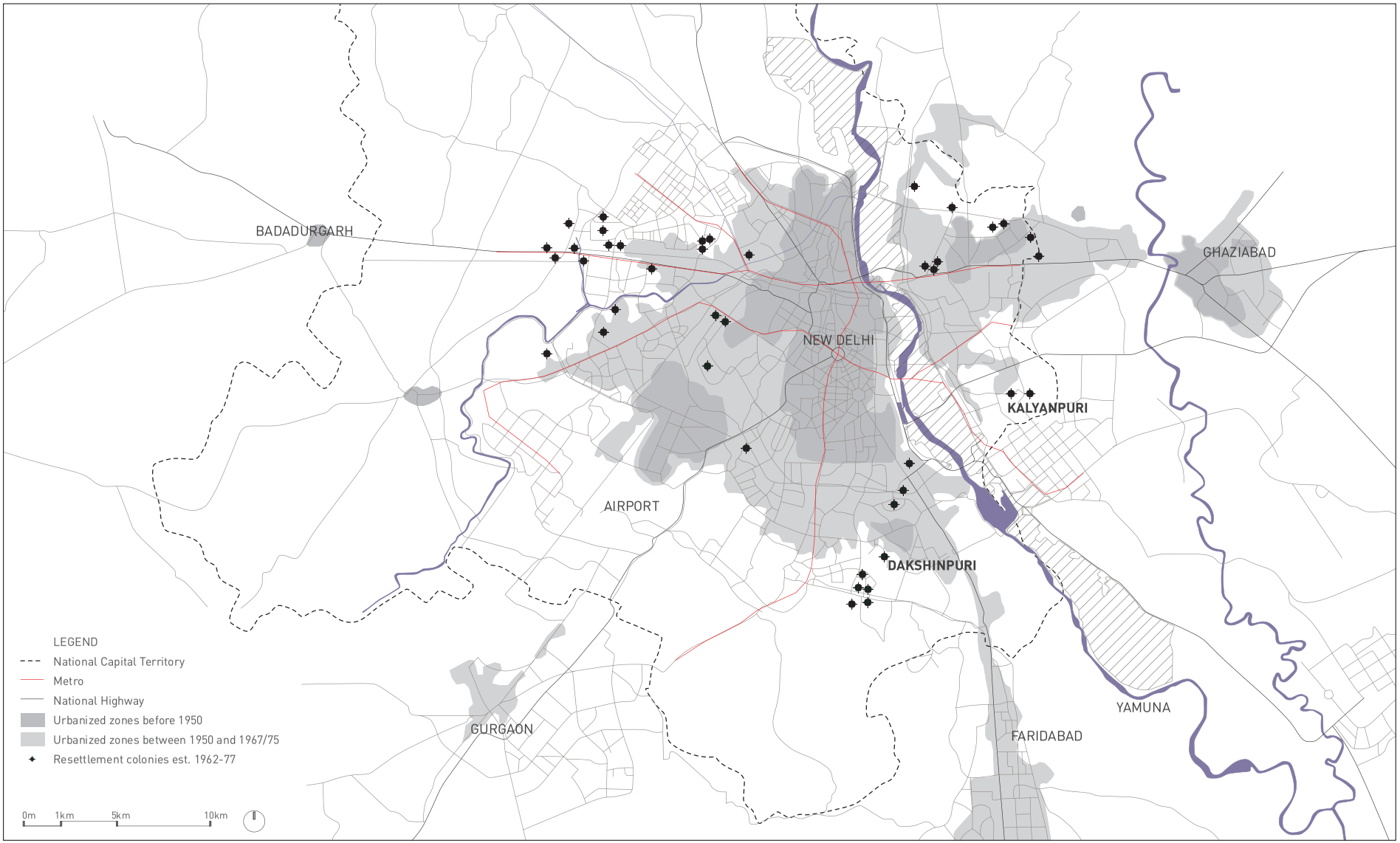
This research aims to provide an insight into how incremental development has changed these older resettlement colonies over 40 years, and also to provide a vision of what Savda Ghevra could become in the future. Map 3.6.1 shows the resettlement colonies established between 1962 and 1977 – including Dakshinpuri and Kalyanpuri – which are mostly located on the fringe of what, during that time, was the urbanised zone of Delhi. Map 3.6.2 shows the new resettlement colonies established since 1991, but mostly between 2004 and 2007 – including Bawana and Savda Ghevra – again established on the urban fringe, with the older colonies integrated into the urban zone. Map 3.6.3 shows the same information in 3.6.2 but this is overlaid on top of an estimated extension of the urbanized zone of Delhi to date (2013).

Map 3.6.1 p. 142
RESETTLEMENT COLONIES ESTABLISHED 1962-77 AND EXTENSION OF URBANIZED ZONE OF UNION TERRITORY OF DELHI UP UNTIL 1975. Between 1962 and 1977 forty-four resettlement colonies were established. Of these, 27 were established during the Emergency Period (1975-77) which saw the most aggressive of slum clearance schemes tied to family planning in the form of sterilization. During this period 120,000 households (approximately 700,000 people) were relocated from the heart of the city to the periphery. The green dots represent the resettlement colonies and the grey zone is the urbanized zone up till the end of the emergency period.

Map 3.6.2 p.143
RESETTLEMENT COLONIES ESTABLISHED SINCE 1991 AND EXTENSION OF URBANIZED ZONE OF UNION TERRITORY OF DELHI UP UNTIL 2000. Like the resettlement colonies developed in the 60s and 70s new colonies have been established since the turn of the century, and like their predecessors these have been established on the periphery of the urban agglomeration which is now even further away from the city centre.

Map 3.6.3 p.144
RESETTLEMENT COLONIES ESTABLISHED SINCE 1991 AND ESTIMATED EXTENSION OF URBANIZED ZONE OF UNION TERRITORY OF DELHI IN 2013. Today the resettlement colonies established post 1990s are now part of the urbanized zone of Delhi. Although the land remains predominantly peri-urban there has been a significant extension mostly in former rural villages becoming medium density towns. Map 1-2 compiled from: (1) Data on resettlement colonies collected from the Slum and JJ Department, MCD, Delhi (Gupta, 2010:p. 87-89); (2)

Maps drawn from www.maps.google.uk; and (3) Urbanized zones (Dupont et al, 2000); and (4) zone interpreted from www.maps.google.co.uk


BADADURGARH
NEW DELHI
GHAZIABAD
KALYANPURI
AIRPORT
DAKSHINPURI
GURGAON
FARIDABAD
YAMUNA
LEGEND
National Capital Territory
Metro
National Highway
Urbanized zones before 1950
Urbanized zones between 1950 and 1967/75
Resettlement colonies est. 1962-77
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5km
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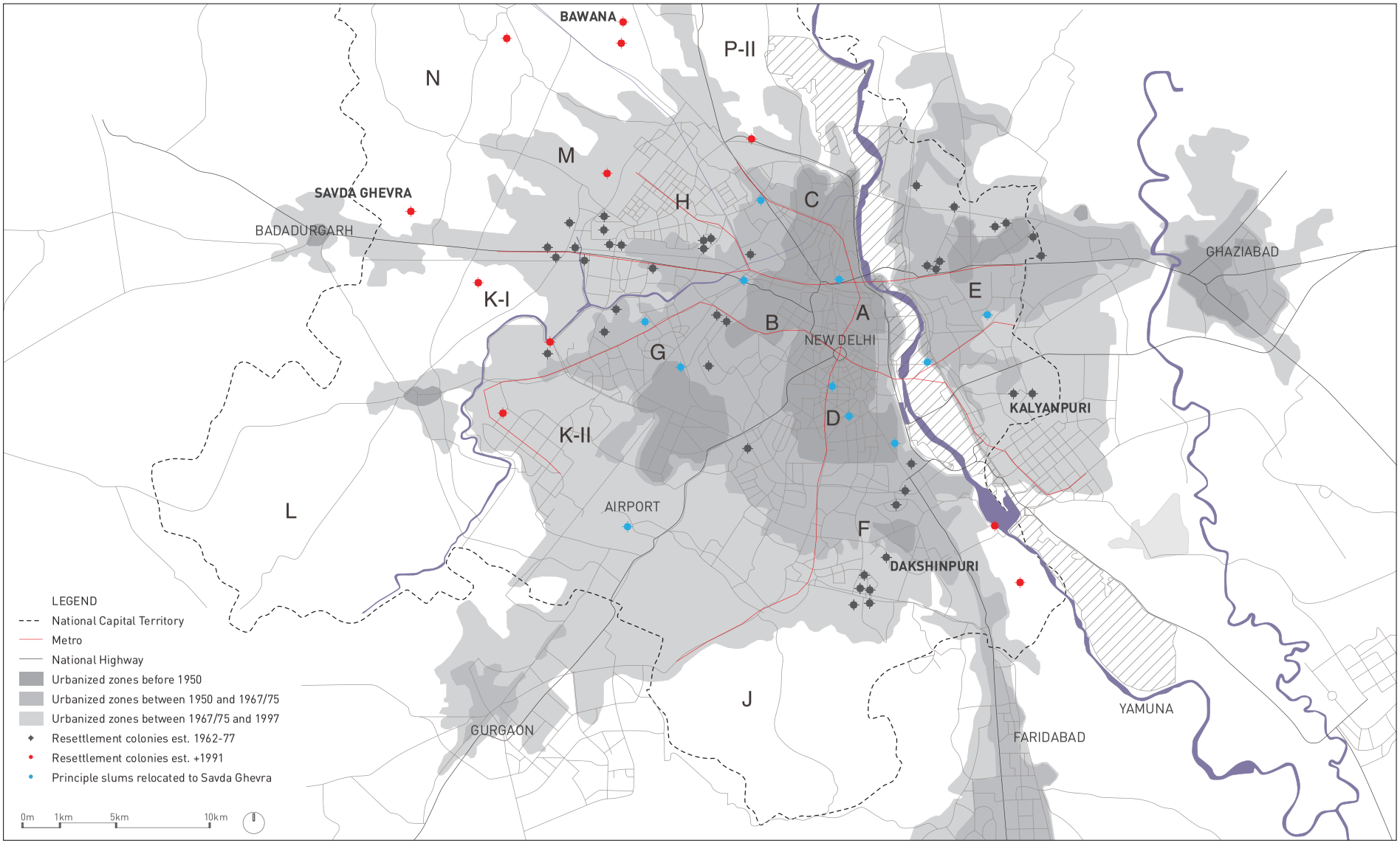
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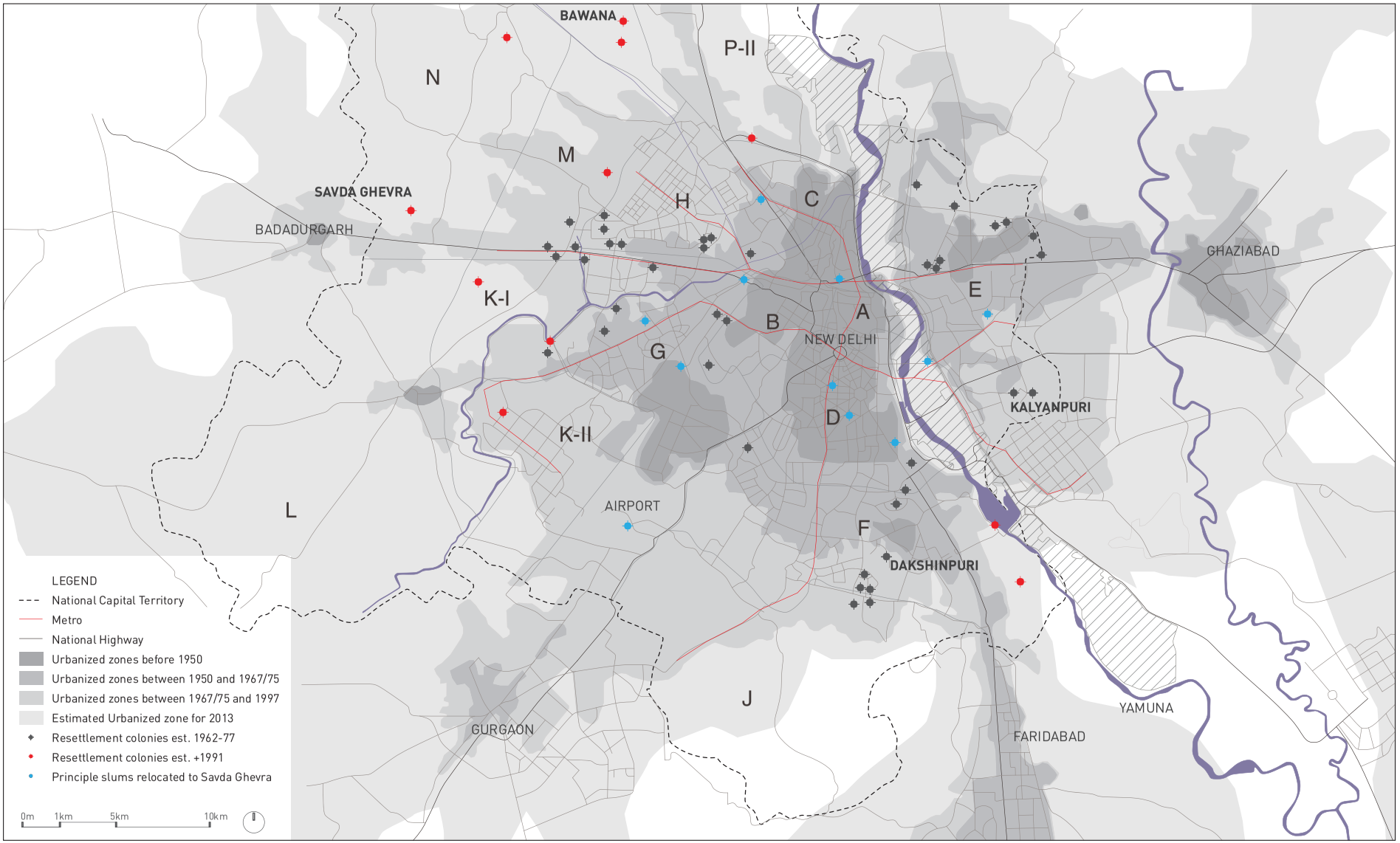
FARIDABAD
YAMUNA
LEGEND
National Capital Territory
Metro
National Highway
Urbanized zones before 1950
Urbanized zones between 1950 and 1967/75
Urbanized zones between 1967/75 and 1997
Resettlement colonies est. 1962-77
Resettlement colonies est. +1991
Principle slums relocated to Savda Ghevra
0m
1km
5km
10km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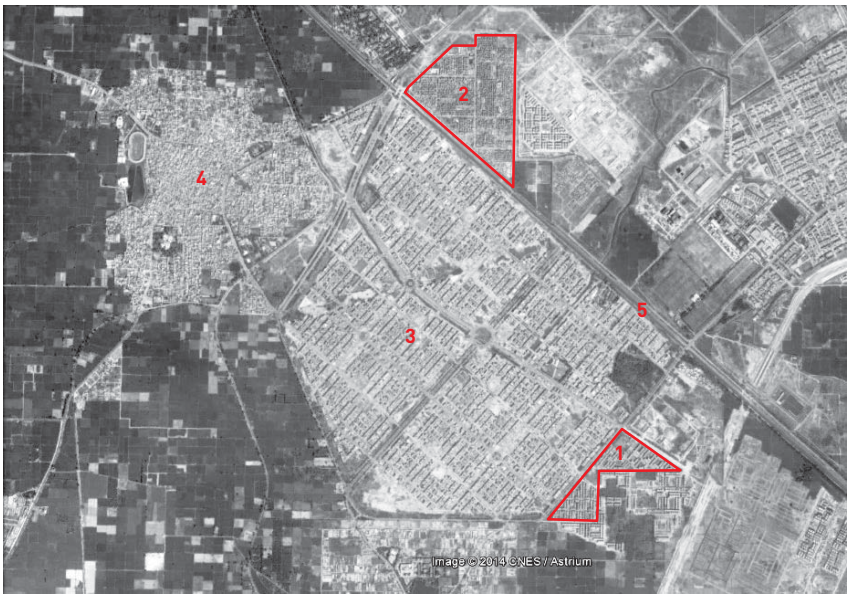
FARIDABAD
YAMUNA
LEGEND
National Capital Territory
Metro
National Highway
Urbanized zones before 1950
Urbanized zones between 1950 and 1967/75
Urbanized zones between 1967/75 and 1997
Estimated Urbanized zone for 2013
Resettlement colonies est. 1962-77
Resettlement colonies est. +1991
Principle slums relocated to Savda Ghevra
0m
1km
5km
10km

3.6.2 THE ALTERNATIVE TO INCREMENTAL: BAWANA A CONTEMPORARY STUDY

The Jawaharlal Nehru National Urban Renewal Mission (JnNURM), was a scheme launched by the Indian government through the Ministry of Urban Development to develop India's cities in 2005 as a programme meant to improve the quality of life and infrastructure in the cities. Public-private partnerships (PPP) were proposed to house low-income groups in a drive to rid cities of slums. Naik and Randolph (2013) in their article "Castles in the Air", write how 'after decades of creating far-flung resettlement colonies for evicted slum dwellers ... the Central government finally refined its thinking on slum policy and introduced the Rajiv Awas Yojana (RAY) project. Though not a panacea, RAY brings in two crucial innovations by requiring, firstly, that slums be redeveloped *in-situ* (no more than 1 km from their current location), and secondly, that housing projects be designed in consultation with slum dwellers.' Naik and Randolph go on to note that high-rise buildings based on PPP models are the preferred policy of the state in practice (and against the spirit of RAY) with the Delhi Development Authority (DDA) proposing tower blocks in numerous sites around Delhi. The challenge ' that pushes the DDA to build skyward is that slum redevelopment projects must achieve the densities that informal settlements have achieved on their own, while ensuring the safety and services necessary for healthy urban living.'

Bawana, a resettlement colony established at the same time as Savda Ghevra is a series medium-rise apartment block settlement developed as a PPP. The resettlement to Bawana, located far north in Delhi's satellite industrial zone, included two schemes – one like Savda Ghevra – a site and service scheme and the other, the subject of this Chapter, a series of low-rise housing blocks officially called the Rajiv Gandhi Housing Project and designed by a Delhi-based architectural firm, Adlakha Associates (figure 3.6.1).



1 Bawana area of study; Bawana resettlement apartments
2 Bawana site and service resettlement colony (not area of study)
3 Bawana Industrail Area
4 Bawana village
5 Western Yamuna Central Link Main Road

Figure 3.6.1 BAWANA 2014. This map shows the site being discussed in this sub chapter: the Bawana flats (bottom right) which are part of a much larger development including the industrial area and other resettlement sites (top). The resettlement colony to the North is much like Savda Ghevra where the residents build their own homes on plots.

Source: base map © 2013 Google

The scheme is, according to the architects, the 'largest industrial workers housing schemed in Asia' using the 'largest number of precast concrete and ferrocement elements' (Adlakha, 2010) delivering 3164 flats of 31.6 or 37.7sqm in the 25.3 acre development. The flats are one-bedroom, kitchen and bathroom apartments each with its own small balcony (figure 3.6.2, image 3.6.1).

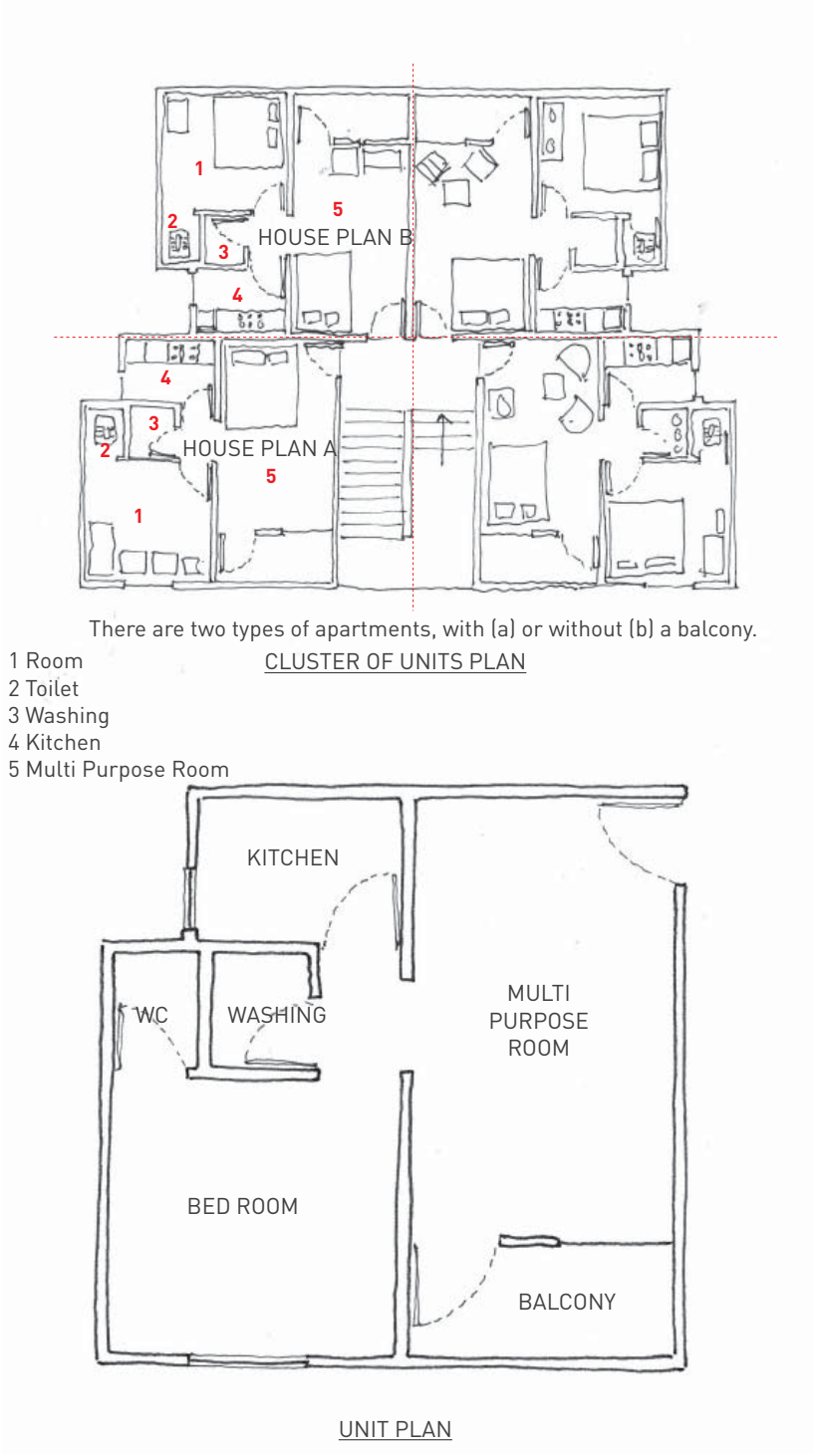
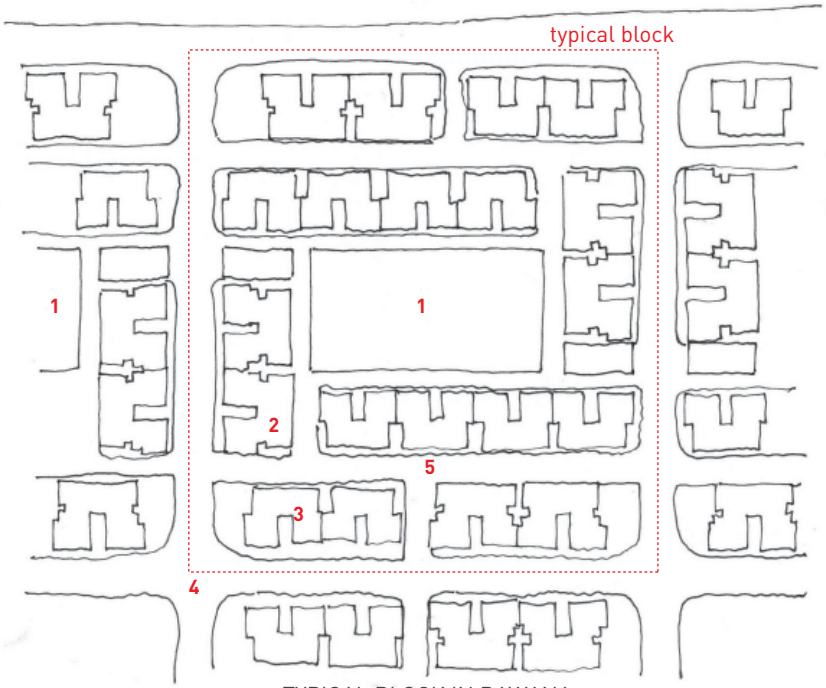


Figure 3.6.2 PLANS FOR BAWANA APARTMENTS. The following plans show the typical apartment layouts. Unlike Savda Ghevra the apartment blocks offer no possibility for growth either vertically or horizontally. Internally the apartments can be inhabited as the owner wishes but with a set floor area and internal walls there is little scope for innovation and alteration.

Image 3.6.1 TYPICAL INTERIOR OF APARTMENT BLOCK. The apartments are basic and lack any type of storage with most items hanging off the windows or string. Monoj who lives in the apartment photographed along with his wife, son and recent daughter in-law said he was very happy with the apartment. When asked about the lack of space to expand he articulated that he didn't see this as a problem now and that he was happy to be in a position where he owned an apartment even if it was so far out of Delhi.

The overall plan of the Rajiv Gandhi Housing Project is a series of low-rise blocks, each with its own green space (figure 3.6.3). However, unlike the houses in Savda Ghevra, with all the customisation seen in Chapter 3.5, there is none of this in Bawana. This results in less town (image 3.6.2) than that which has appeared, for example, in 'A' Block in Savda Ghevra (the photo is taken at a similar time as the comparison of 'A' and 'M' Block in Chapter 3.4). So, although the residents are happy in terms of moving straight into an apartment, in the long term there seem to be problems. These include a lack of shops, work opportunities and a potential to expand to cater for extended families.



TYPICAL BLOCK IN BAWANA

1 Park
2 Block Type 'A'
3 Block Type 'B'
4 Main Roads
5 Secondary Roads

Figure 3.6.3 LAYOUT OF ONE BLOCK OF APARTMENTS, BAWANA. Source: Adlakha, 2010 re-drawn by author.

Image 3.6.2 TYPICAL STREET IN BAWANA. In a similar time frame no shops, markets, and business (as seen in Savda Ghevra) have emerged. The impact of this is most felt when walking around what are mostly empty streets.

3.6.3 TWO HISTORICAL PRECEDENTS OF INCREMENTAL CHANGE IN RESETTLEMENT COLONIES: DAKSHINPURI AND KALYANPURI

Unlike Bawana, and like Savda Ghevra, Dakshinpuri (figures 3.6.4 and 5) and Kalyanpuri (figure 3.6.6) are site-and-service developments where beneficiaries were allocated a plot to build on. Again, similarly, the plots are planned in a linear manner unlike the organic patterns typical to informal slum settlements.

Figure 3.6.4 LAYOUT PLAN OF DAKSHINPURI 1978. Dakshinpuri is comprised of 31 blocks, numbered 1-20 and lettered A – L; each block consisting of around 400-450 houses. The plots are 20/25 sq m (in contrast to 12.5 and 18 in Savda Ghevra) 3m wide and 7/8m deep.

Source: Data from the Slum and JJ Department (Gupta, 2010:p. 92). The original colony, numbered 1-3, was developed first and not much later, 'Dakshinpuri Extension' numbers 4 -20 was built to the north.

KEY
- Dispensary
- Market
- Temple
- Pump House
- Hospital

Figure 3.6.5
DAKSHINPURI 2013.

Source: base map © 2013 Google

- School
- Market
- Cinema
- Pump House
- Dhobi Ghat

Figure 3.6.6 KALYANPURI 2013**.**

Source: base map © 2013 Google

Kalyanpuri and Dakshinpuri, both established in the 1970s, were part of a move by the government to expand Delhi east of the Yamuna (trans-Yamuna). Both Dakshinpuri and Kalyanpuri, in terms of how the plots have developed, offer similar evolutions. Images 3.6.3 and 4 show a typical street view with housing to either side in Dakshinpuri and Kalyanpuri respectively; what is immediately recognisable are the narrow lanes and dense / vertical houses with small fronts.

Image 3.6.3
DAKSHINPURI STREET.

Image 3.6.4 KALYANPURI STREET.

Housing, on both sites, is, on average, three storeys high; of which one floor is often rented for additional income. In addition many households have developed the ground floor as a commercial establishment. These include computer centres, mobile phone top-up stalls and small shops (such as the house in image 3.6.5). Residents during interviews described a process whereby at first they lived in a single storey *kuccha* structure and, over time, building vertically, made their homes into *pucca* structures.

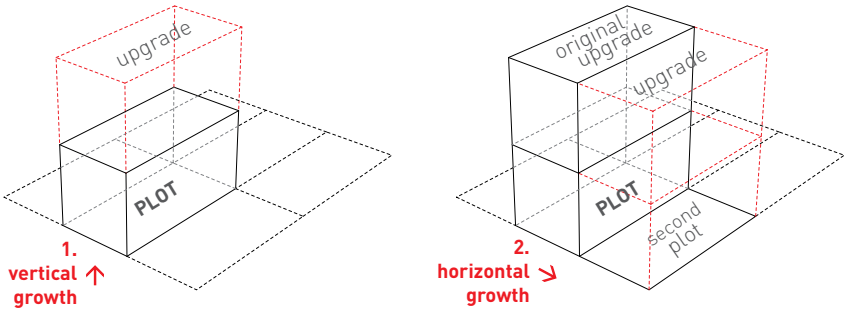
Image 3.6.5 KALYANPURI HOUSE / SHOP. The house to the left is 3.5 stories high and is fully air-conditioned; the neighbouring house on the right is 3 stories high and more open to let air in. The house to the right has a toilet cubicle which can be seen on the third floor. A bamboo ladder is placed as a cheap way to access the roof. The shop front extends beyond the plot boundary; in recognition that this is encroachment the shop is made of cheap, *kuccha* materials so that if the MCD deems this illegal and demolishes it little investment is lost. The house to the left rents the ground floor out; a separate entrance can be seen to the left which is used by the owners. Most rental accommodation in both Kalyanpuri and Dakshinpuri consist of partitioned off areas which act as a secondary source of income. These apartments are rudimentary and often do not include toilets but they offer a cost-efficient way to live in the city centre. In Mumbai this practice is so prevalent that about 80 percent of the low-income rental market is met by the informal sector in slum and resettlement areas (Mehra, 2012).

Residents of Dakshinpuri described the site as woodland when they arrived, describing how they had to cut back bramble and bushes to make the site accessible. An old lady, Devi Nandini, told me that she described this hard work as 'place making', establishing the sense of commitment and community which still exists today; the shared experience increased social bonds. The process, or the story of arrival and hardship overcome, is a story the older residents are keen to tell, and forms part of the collective memory of Dakshinpuri.

3.6.4 VERTICAL AND HORIZONTAL INCREMENTS (KALYANPURI)

The transformation of houses in both Kalyanpuri and Dakshinpuri is a transition through a series of individual and collective thresholds. These are expressed through, but not limited to, the condition of the fabric, the cultural and historical values at different horizons of involvement, the embodied energy in the construction and its use, and, finally, the service infrastructure available. Most of the houses are three storeys high in compliance with the local building code. Another restriction to vertical growth beyond three or four storeys is that small plots make it difficult, technically, to build up. In addition, access becomes an issue the higher the structure; lifts are not affordable for such small structures and there isn't enough room for multiple staircases if the plot is to be vertically subdivided. Dwelling space is expanded by encroaching on the street (public land), but only to a limited extent. The more *pucca* the structure, the higher one can build and the more one's house can become more than just a shelter, even to the extent of being used for income-generating activities. In Kalyanpuri incremental growth is also happening horizontally. Image 3.6.6 shows two plots side-by-side which have merged together (see also figure 3.6.7).

Image 3.6.6 HORIZONTAL INCREMENTS. The Singh family moved to Kalyanpuri in 1979 and purchased the second, neighbouring, plot not long afterwards. They are currently renting another apartment and refurbishing the entire ground floor to accommodate a new bride who has married into the family. They are adding another kitchen and are looking at adding another floor in the future when their younger son marries.



VERTICAL GROWTH HORIZONTAL GROWTH

Figure 2.6.7 INCREMENTAL ACCUMULATION. This diagram shows the accumulation of plots by the Singh family. With height restrictions and the lack of robust foundations such expansion is preferable.

The house accommodates, at all times, at least three generations, with grandparents, children and grandchildren living together. When a young woman marries into a family she will move in with her husband, his parents, grandparents and siblings. The more boys a family has, the larger the home needs to be to accommodate their wives, and eventually children. This research examines the hypothesis that incremental additions are better suited, especially for the poor, to accommodating this growth as and when it happens. In parallel this research asks: does the alternative, apartment blocks with a set area and no room for expansion, encourage a break with this traditional way of life - and the social burden that comes along with it?

3.6.5 INCREMENTAL ENCROACHMENT (KALYANPURI)

The residents of Kalyanpuri came from various inner city slum clusters that were demolished prior to resettlement. It has always been a working class neighbourhood composed of predominantly poor (historically) ex-rural migrants who arrived in the city seeking work based on territorial, kin and caste networks. The initial nucleus of Kalyanpuri was formed by groups of people eligible for resettlement by the state. Subsequent expansion occurred with the addition of relatives, fellow villagers and additions within the settlement through birth of marriage. This influx couldn't all be accommodated into the housing built on the plots allocated by the state. The result is that over time 'empty' spaces, formally park spaces in accordance with the masterplan, have been taken over by families residing in *kuccha* housing – forming 'slums'; meaning illegal, with poor quality housing and no services (figure 3.6.8).

The *kuccha* structures in the parks marked in figure 3.6.8 appeared slowly over time and are composed of families mostly related to the residents of the legal, formal plots of the resettlement colony. The result is that there is no tension between the two communities. In the trade-off between green space and housing, housing wins and family network structures are explicit in this.

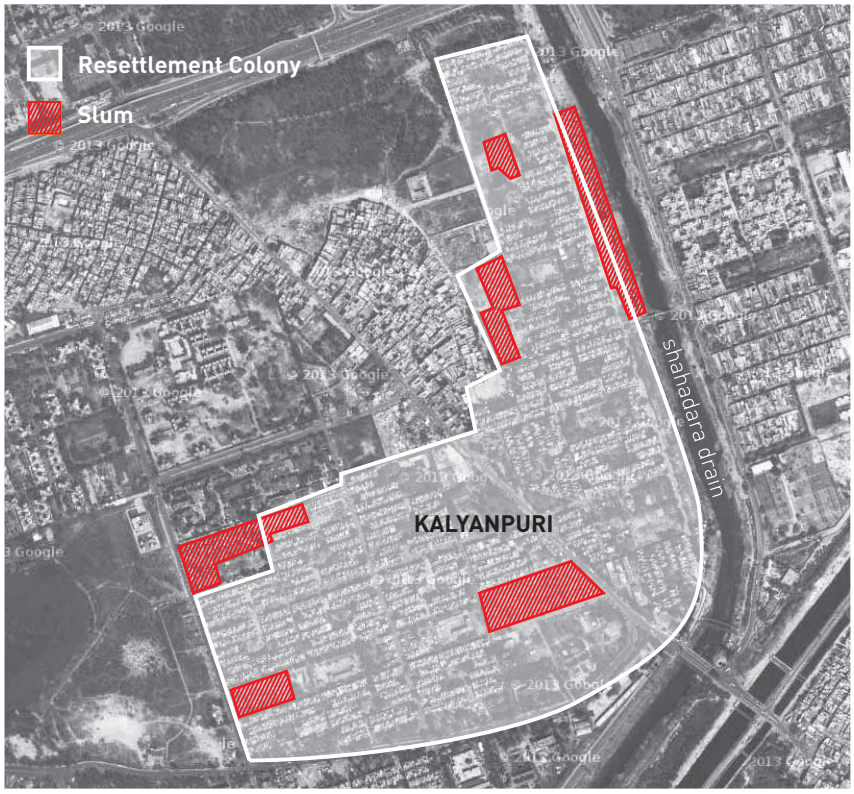


Figure 3.6.8 SLUMS IN UNOCCUPIED PARTS OF THE MASTERPLAN FOR SAVDA GHEVRA. The following map illustrates in yellow the park spaces which have been transformed into slum or *jhuggi jhompri* (JJ) pockets within the colony.

3.6.6 INCREMENTAL SANITATION (DAKSHINPURI AND KALYANPURI)

As the whole neighbourhood expanded there was increased confidence, security and permanence in the physical form of the neighbourhood. The physical process of permanence was deeply linked with increased access to services and the subsequent infrastructure to support this. The interplay between the incremental growth of the home and access to sanitation is the most important condition for stimulating development.

The plans for Dakshinpuri, like all resettlement colonies to date, included a standard house type (figure 3.6.9) which set out limitations for housing size both in plan and elevation.

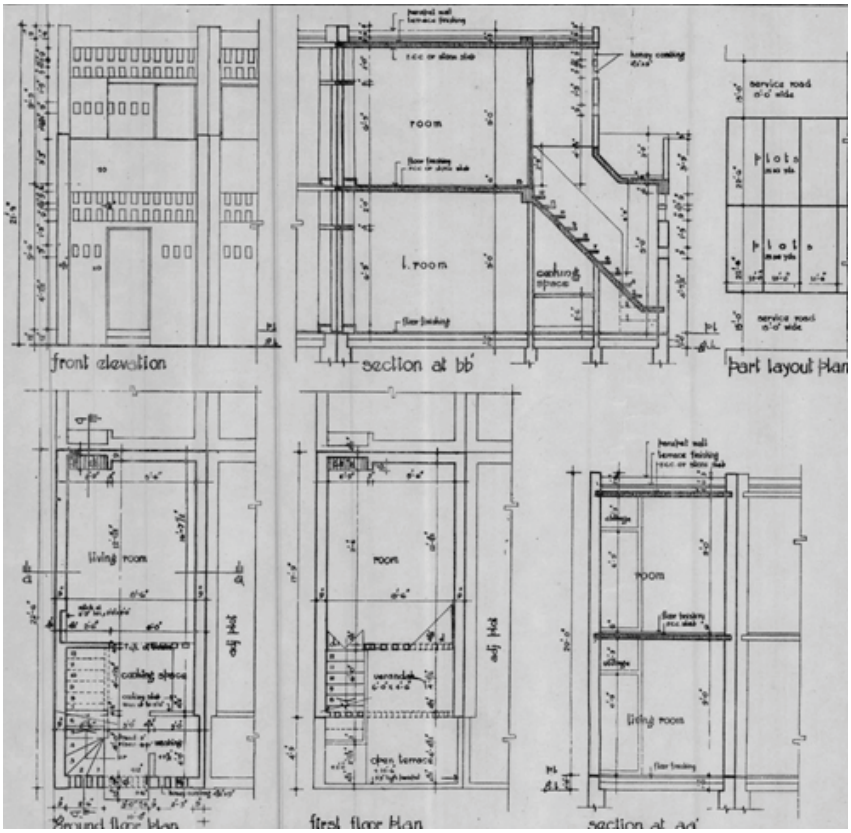
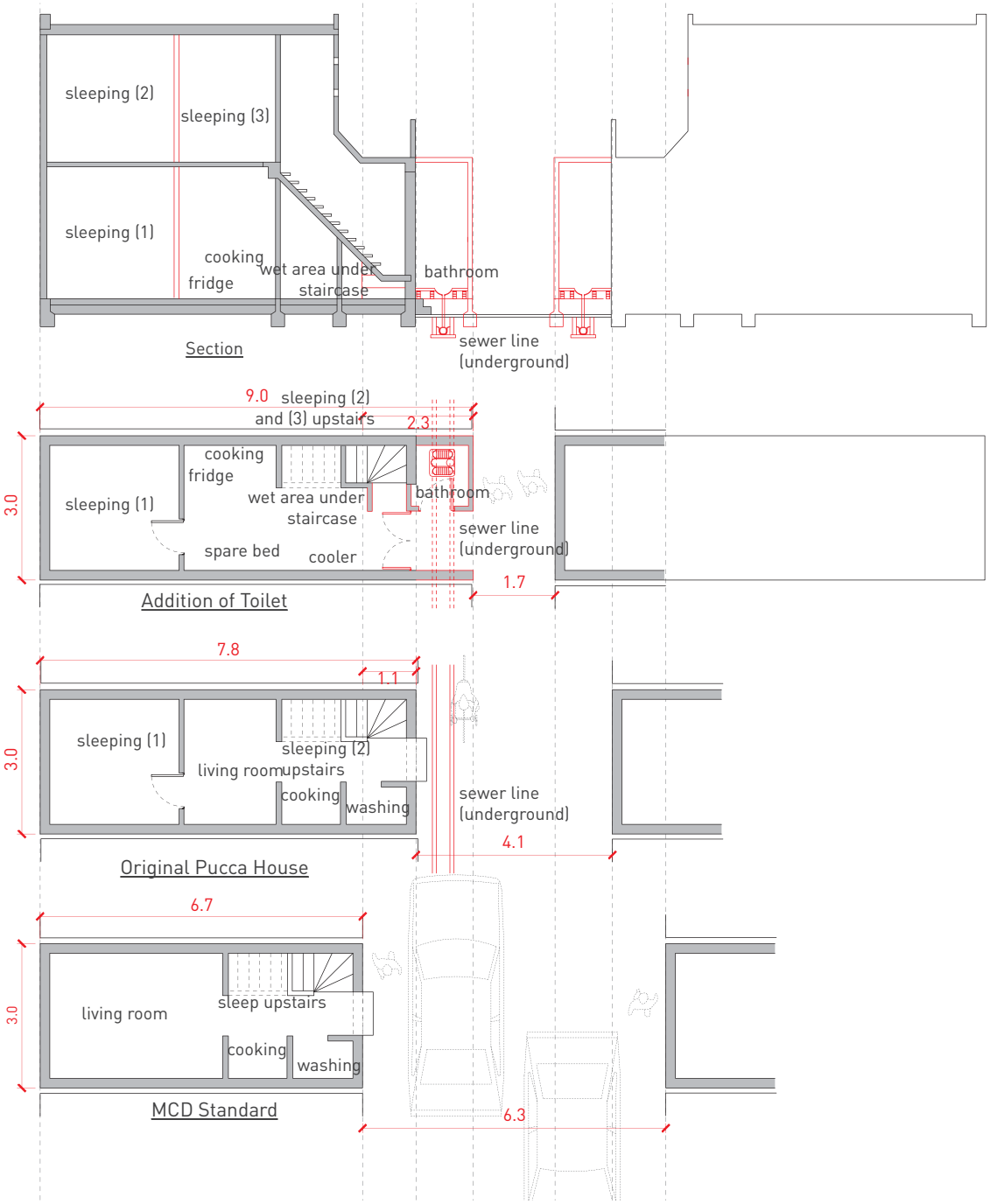


Figure 3.6.9 STANDARD PLAN OF HOUSE FOR RESETTLEMENT SCHEME IN DAKSHINPURI OF 21 SQ M. The plans are in effect a building control document for housing development. Any construction beyond the area indicated is theoretically illegal, limiting development to 3 x 6.7 m plots (Gupta, 2010:p.78). It is worth comparing this plan against the standard for Savda Ghevra located in Chapter 3.5.1, figure 3.5.1.

However, the reality has been that over time all the houses have radically extended beyond the legal limits both in plan and section. Figure 3.6.10 describes this evolution showing the incremental addition and expansion in Dakshinpuri where sanitation has also arrived in stages. From the outset houses were built encroaching into the road, typically to a depth of 7.5 meters as opposed to the stipulated 6.7 meters. The result is that the houses are long and narrow which makes them hard to ventilate and illuminate. In Dakshinpuri open drains were installed next to the houses; but the large u-channels intended to move storm water became the receptacle which connected into the nearby municipal main sewers. Families then encroached further into the road, placing their toilets directly over the drain, connecting their toilets vertically. The result is that today the lanes, *galis*, are very narrow and not wide enough for a fire truck. This is an example of how, whilst incremental urbanism has brought sanitation improvements, the *ad-hoc* process can also cause problems. Similarly in the late-1980s, as Kalyanpuri grew large enough to be a vote bank, a resident ran for local office and knew that to win votes he would need to deliver something for the neighbourhood – he gave them sewerage.



The Evolution of Housing in Dakshinpuri

Figure 3.6.10 THE EVOLUTION AND ENCROACHMENT OF HOUSING. The diagram shows the typical transformation starting with the 'MCD standard' (bottom) followed by the typical house built – 'Original *Pucca* House' (middle) – and then the 'Addition of the Toilet' (top plan and section).

3.6.7 CONCLUSION

Dakshinpuri and Kalyanpuri are very different neighbourhoods in terms of how they are perceived, internally and externally. The residents in Dakshinpuri were keen to express how much they liked living there and what a great sense of community there was; there was much less of this in Kalyanpuri. Furthermore Kalyanpuri has a bad reputation, it is notoriously difficult to get an auto-*rickshaw* driver to go there and Kalyanpuri has more recorded problems such as drugs and violence. During interviews with residents I was accompanied by architect and urban scholar Ruchita Gupta from the School of Planning and Architecture at the Guru Gobind Singh Indraprastha University (Formerly TVB School of Habitat Studies). She explained the difference by pointing out that Dakshinpuri, unlike Kalyanpuri, was one group of people who moved and resettled together. Gupta argued that Dakshinpuri has avoided being saturated with newcomers (outside of family and village structures) and itinerant renters. An un-published report by Gupta estimates that 95% of Kalyanpuri is no longer composed of the original beneficiaries – with the owners selling on their plots - as opposed to 50% in Dakshinpuri (Gupta, 2011).

The evolution of housing in both Kalyanpuri and Dakshinpuri shows how architecture, both in its making and in its substance is a vehicle for structuring the difference that allows 'places' and a 'town' to emerge as the setting for civic engagement. Incremental improvements are part of the process of empowerment whereby the community, through negotiation, accommodation, conflict and collaboration generate change.

In summary, both Dakshinpuri and Kalyanpuri have evolved into multi-storey housing neighbourhoods, imposing a strong physical and civic presence in the city. This growth has been predominantly vertical however; in the case of Kalyanpuri, houses have merged horizontally, enabling plots to safely become larger. A by-product of this growth is that more residents can live in the neighbourhoods and, in the case of Kalyanpuri, has attracted more people than can formally be included, resulting in informal and illegal settlements in park spaces. Another difference between Dakshinpuri and Kalyanpuri is that Dakshinpuri allows only a limited amount of newcomers (a form of gated community) in comparison to Kalyanpuri. This suggests a line of questions about the role of dormitory town within the metabolism of incremental urbanism; and the limitations of incrementalism in terms of freedom (as defined in the research question). For both colonies the addition of sanitation infrastructure triggered a housing economy and helped create the sense of a permanent neighbourhood. It appears that, for a civic culture to work, all residents must subscribe to the view that individual betterment is collective betterment, as we also saw in Savda Ghevra with loaning, the milk shop and the sanitation project. Otherwise the result is a dormitory town, a holding-pen until something better can be found elsewhere, whether this takes the form of housing, schooling, health care, or a job on which basis houses are worth improving. The latter also implies renting rather than buying or making an investment.

4. ANALYSIS & CONCLUSION

The resettlement colonies of Savda Ghevra, Bawana, Dakshinpuri and Kalyanpuri are all by-products of a failure of planning to meet the demand for housing. This demand is fuelled by migration, which is motivated by aspirations to reap the benefits of living and working in Delhi. As a result many residents end up in informal or substandard housing. The attempt by the state to create a 'slum-free' city – a drive more akin to sanitising (Dupont 2008, Khosla 2010) than planning - has resulted in many residents being shifted from inner city slums to peripheral working class suburbs: resettlement colonies. The process of resettlement from the centre to the periphery is one that has been repeated, with the first wave happening in the 70s, and the second wave in the last decade (as illustrated in map 3.6.1 and 3.6.2, Chapter 3.6). Savda Ghevra residents arrive imbued with the existing traditions and cultures from their previous environments. So, although Savda Ghevra is barren land there is, culturally, no such thing as a *tabula rasa*. New residents arrive with a city savviness acquired through years of informal navigation around the heart of the city. What emerges is a picture of how a traditional culture tries to adapt and to be political – to have agency to get things done, such as sewerage which demands the involvement of a clutch of institutions.

The live projects provoked a series of responses to the research question which asks what is the role of sharing in the incremental process of city making in the context of resettlement colonies, especially Savda Ghevra? The questions seeks to reveal the institutions which become agents through sharing and incrementalism, facilitating access to the freedoms (Sen, 1999, 2013) offered by the city of Delhi. The introductory chapter presented three rationales for the approach of the research presented in the previous Chapters:

i) Firstly, in 'Development as Freedom', Amartya Sen argues for a conception of development linked to the creation of capabilities. Sen's concept of freedom provides a useful theoretical framework to understand development because it is not the absence of rights in the India context but the actualization of those rights into participatory capacities which is at stake. The empirical body of work presented here demonstrates how shared incremental improvements result in - what will now be analysed - as freedoms. Freedom for basic services but also freedom for the residents of resettlement colonies to be active agents in their 'town' as an increment of the city. The contribution of this research in advancing the debate of 'development as freedom' is to offer examples of concrete, material insights on capacity building (participatory process) on the ground rather than abstract concepts of 'freedom'.

ii) Secondly the importance of sharing in achieving 'development freedoms' or removing 'unfreedoms' found in the research will be discussed. The research contributes to ideas of sharing going beyond the moral questions of equitable distribution and social capital (Sennett, 2006 and Ostrom, 1990) to how one makes a claim and participates. The following chapter raises the issue of how one can extending sharing through formal and informal institutions that build up on this process, their limitations and how this links with incrementalism.

iii) And lastly, contributing to debates on incrementalism in identifying opportunities for intervention. Thus in the analysis it is not incrementalism *per se* that matters but a certain way of building a dwelling which allows for incrementalism. Advancing on the literature with a description of where the incremental approach leads to increased freedom, as indeed it is not always a given even if the process is incremental.

The three rationales are a call for understanding research as a practical design problem, rooted in everyday life and recognizing the value in engaging with real, on the ground, processes which make the city. The methodology, using the role of the architect within this context enabled the discovery of the process of exactly how the residents invest in their physical, cultural and political environment and how that topography changes as a result of this investment through the lens of architectural practice. This is an important point of departure from the existing literature on development and contributes to literature on architecture and community participation (Hamdi, Turner).

The thesis presents unplanned processes in the coming together around the production and maintenance of small scale infrastructural configurations in the form of live projects. These configurations carried out by the author test the practice, limitations and implications of sharing, by residents in the process of incremental change in the peripheral slum resettlement colony of Savda Ghevra, Delhi. The research investigates the extent to which residents, sharing in the process of incremental development of Savda Ghevra can facilitate the exploration, creation and harnessing of opportunities available to them in the city; and thus contribute to the making of civic culture through capacity building. The study shows how these shared incrementalisms relate to the subsequent improvement of the built fabric both at the level of the individual household and the neighbourhood generally. In addition to the live projects the research identifies how marginalized residents in slum resettlement communities participate in the making of the city, through shared incremental moves as observed during fieldwork.

In this final chapter the author will analyse and draw preliminary conclusions about the role of sharing possible in the incremental process of city-making and the kind of institutions which enable city residents to acquire the capacities which can give them access to the freedoms offered by the city. The chapter begins with an analysis of the politics and culture of incrementalism as understood through material changes using metaphors of sedimentation and accretion, among others, described as a spectrum.

4.1 A SPECTRUM OF IMPROVEMENTS AND COLLABORATION

Collected from the housing surveys identified in Chapter 3.5, figure 4.1 shows the typical transformation of dwellings, defined as incremental, by which residents build up their homes over time in the Delhi resettlement colonies studied[1]. The incremental upgrading of homes shows how housing investment results in increased improvements of the built fabric as the structures become more permanent. At one end of the spectrum there is a temporary shack made of tarpaulin and reclaimed materials and at the other end there is a permanent multi-storey structure made of brick and reinforced concrete. The diagram is divided between early stages found in Savda Ghevra and the last two stages typical of the older resettlement colonies, Dakshinpuri and Kalyanpuri. In all three sites dwellings have evolved over time.

Figure 4.1 THE 'SPECTRUM'.

This Chapter will proceed to define this process of incremental improvements as a 'Spectrum of housing types': a spectrum which starts with the *kuccha* shacks of Savda Ghevra and ends with the three-storey *pucca* houses found extensively in the older resettlement colonies, Dakshinpuri and Kalyanpuri. This Chapter will discuss the 'Spectrum' as a transformation from a subsistence settlement through to the potential for middle class, individualised city living. The spectrum consists of an aggregate of individuals through to the mutual commitment and institutionalised politics of 'civic' order or 'town', where civic culture is seen not only as a commitment to place, but also the act and possibility to be part of, and shape, one's local environment. It is also an understanding of the city as a receptacle for culture. This introductory analysis presents the potential of what is defined as a 'sweet spot' that exists between subsistence and middle class(ness) where incrementalism and sharing seem to have the most impact on the making of the civic order (town) and engendering freedoms.

4.1.1 The Bottom End

The research identified the bottom end of the spectrum as consisting of *kuccha* and semi-*pucca* houses whose residents are too poor to invest in incremental change. For these residents of Savda Ghevra their poverty is exacerbated by the disruption of resettlement, the lack of local work opportunities, poor health, and general hardship. The scale of transformation needed along the spectrum is so huge – in all senses: physical, economic, decorum and status - that it can never be funded by the residents alone. For the very poor, their living standards will remain low and their ambitions focused on short-term survival. For the *kuccha* shack dweller with insufficient funds to invest in their home, life is characterised by a daily struggle and hand-to-mouth existence. Life at the bottom end in Savda Ghevra means one must carry water daily to one's home, the fabric of the house will regularly deteriorate, one will defecate in the open, and most living activities will happen outside because the home is damp, dark and dusty. Such families will not have regular work yet, despite this poverty, these families manage to find the sum required to buy the lease on their plot, sometimes without employment or other support networks.

4.1.2 The Top End

Once incrementalism is put in place at the top end of the spectrum in Savda Ghevra the houses become two / three storeys high with a total floor area of between 30 and 45sq m. The plots in Kalyanpuri are larger, 25sq m, so when fully developed to the typical standard of three stories, dwellings in Kalyanpuri can offer a floor area of 75sq m - 75%. Well above the national average of 100sq m for a typical apartment in the formal housing sector (The Times of India, 17 May 2013). At the top end of the spectrum, many residents of Kalyanpuri and Dakshinpuri have air-conditioning, satellite television, an in-house toilet with multiple rooms spread over three floors. Similarly at the top end of the Spectrum in Savda Ghevra the houses also have toilets, multiple occupation and activities such as washing and cleaning also happen inside the home. In all three colonies at the top end of the Spectrum the houses offer opportunities for additional incomes through the transformation of the additional space in shops, space for small business, or rental accommodation. These activities are notably absent in Bawana. Homeowners at the top end of the Spectrum tend to have regular work which can support such an investment or provide the means to pay for it in cash or credit.

In identifying this continuum the following sections will describe the Spectrum based on the research presented in chapter 3. The following four sections illustrate the overlapping themes of the Spectrum:

i. Barriers and Accelerators that push and pull movement along it
ii. The spectrum as upward mobility
iii. Cultural, physical and material attributes along the Spectrum
iv. Legal and political capacity along the Spectrum.

4.2 BARRIERS AND ACCELERATORS ALONG THE SPECTRUM

A *pucca* house will cost in excess of £1500 whilst a semi-*pucca* house can range between £250 and £1000[2]. Although the step-by-step approach should make it easier to upgrade, survey work in Savda Ghevra showed how 95% of structures remain single-storey, which for an average of six people living in 18 or 12.5sq m plots, is, by any standard, too small. Based on resident interviews and the high number of even small investments 65% of loans in Savda Ghevra are taken for construction purposes (CURE, 2012, p.22). This is a figure which suggests that people do want to upgrade and improve their homes. This impels the question into why, or what is impeding incremental growth? Is it for financial reasons, a lack of alternative financing solutions, the lack of regular work in the area and/or the limited scope for investment, or is it because the lease of ten years is not enough to build confidence in the householder to make incremental improvements, investing precious capital in an uncertain future? What are the accelerators and barriers of this process?

4.2.1 Accelerators

Investment into incremental growth is the product of the relationship between risk, income and available surplus of the household in relation to its neighbours and, in turn, the neighbourhood and the city. The incremental expansion of houses is the by-product of not only surplus cash (income in relation to risk) but also an increased sense of confidence. As described above, those families at the bottom end of the spectrum, which in the case of 'A' and 'M' Block (Chapter 3.5.2 and 3.5.3), represents 59% and 68% of the dwellings respectively, struggle to engage with

incrementalism. One reason is due to a loss of income associated with resettlement to the outskirts of the city far from work which means that families are struggling to further develop their plots.

However, unlike the slums where the residents from Savda Ghevra came from, they now have more security because of their, albeit partial but formal tenure. The residents were enticed to Savda Ghevra with the promise of the opportunity to engage with, and perhaps acquire, some of the middle class values embodied in home-ownership, even if that ownership was limited initially by the offer of a lease of just ten years. Ghataum Bhan describes this as 'taming the frontier' whereby the poor are enlisted to develop peripheral land for future speculation (Bhan 2010, p.10). What appears like engagement with the middle class values of home ownership is, as described by Ursula Rao discussing Savda Ghevra, a "skilful manipulation of minimal resources... The struggle is not just for survival but also legalisation" (Rao,2010, p. 409). This "struggle" is an effort to create legitimacy as an urban citizen through mechanisms of home building. This 'struggle' is encouraged by government and city policies in India and Delhi, which make housing the heart of urban citizenship. Survey work revealed this struggle, for example, the family who lived in the *pucca* house surveyed in Chapter 3.5.2 described how they lived in a *kuccha* house whilst living in the city centre despite having the finances to invest in a better home. The move to Savda Ghevra resulted in the immediate investment in a *pucca* house with future investments already planned despite the precarious tenure arrangements.

However tenure in isolation, based on the limited investment seen in Savda Ghevra and from the work of DeSouza, is not sufficient to incentivise the housing economy. In other words tenure is not the universal accelerator De Soto (2001, introduced in Chapter 1.4.3) argues it is. DeSoto would argue that that the incentive isn't there because of the risk of demolition when the ten-year lease to the title ends in 2016. However, when discussing this with residents and NGO workers there was a universal consensus that the lease would be renewed, as there was no historical precedent where a title issued to a resettlement colony resident was revoked. What emerged from interviews, and in particular with the process of developing the Sanitation Project, was that physical presence - which is perceived as something that cannot be demolished, without some form of hefty compensation by the state or other body - is more important. So unlike the *kuccha* structures found in slums it is the perception that *pucca* houses cannot be simply bulldozed is as important as legal tenure. This falls in line with various studies of informal settlements globally whereby it is the dwellers 'perception' of their 'property status' over formal property rights which incentivises investment (Razzaz 1993, Van Gelder 2007, Doebele 1978, Scott, 2012). What this implies is that there needs to be a sufficient constituency of permanent *pucca* houses to actualise and formalise the already existing legal right.

Thus, physical improvements are accelerated by a mixture of *defacto* and *dejure* tenure; arrangements which in turn affect societal arrangements in the home. Survey work revealed how houses further along the spectrum of incremental improvement can support larger families. Vertical growth results in more space and opportunity for infrastructural investments such as toilets which can not only serve larger families but also attract brides[3]. Larger families in vertically expanding dwellings means densification, which translates not only into a critical political mass (and the leverage that comes with that) but encourages local economies to support a growing population. For example, as 'A' Block has densified new businesses such as a tailor, a hairdresser and an arcade room sprung up. Improvements didn't always result in communal change, for example, the shared borewell (Chapter 3.4.2) which aside from raising the standard of life for the residents of the 'AKT' Street, arguably institutionalised the

conditions to support incremental growth. The borewell project was triggered by families who had all moved into double storey structures and wanted better access to water. The arrival of the borewell revealed how, as structural and environmental changes occur, so do normative behavioural patterns. For although the borewell project resulted in more economic sharing at a street scale the subsequent incremental improvements promoted, and possibly induced, more individualised behaviour as, for example, washing moved from the public street to the private enclosure of the house.

4.2.2 Barriers

Survey work revealed that the trajectory was not always positive and even in some cases moved backwards. The most fundamental barrier is poverty: most families live in such poverty at the bottom end that long-term asset building (upwards incrementalism along the Spectrum) is impossible when faced with what Jérôme Bindé calls the 'tyranny of emergency.' He explains:

> *Emergency is a direct means of response which leaves no time for either analysis, forecasting, or prevention. It is an immediate protective reflex rather than a sober quest for long-term solutions. It neglects the fact that situations have to be put in perspective and that future events need to be anticipated. Devising any durable response to human problems... requires looking at a situation from a distance and thinking in terms of the future. (Binde, 2000, p. 52)*

Because of Savda Ghevra's peripheral location, such poor families are now trapped in worse poverty than they face where they came from (CURE, 2010). Khosla and Jha (2005) present research which shows a decline in earning, particularly for women, creating a 'poverty trap' which is an impediment to incrementalism. The housing survey of 'A' block showed how families tried to invest in their *kuccha* homes. However, most poor households only managed to make the transition from *kuccha* to semi-*pucca* dwellings with little or no resulting improvement in their standard of living or any increase in their capabilities or opportunity to find work. This 'poverty trap' effectively detaches those at the bottom of the Spectrum from the process of playing a role in shaping conditions individually and collectively around them. Poverty and the associated lack of access to capital is perhaps the most fundamental barrier to incrementalism. The Core House project was triggered by the team (author and CURE) setting up a revolving housing fund releasing credit for the family to invest in their new home. Without which the project would not have happened. This then presented another barrier to innovating: working on credit (at the unheard-of interest rate of 0% on the loan) meant that the family went 'all out' from the onset. The ability to borrow overrode the possibility to experiment; for example, when asked if they would be open to a rammed earth wall to in-fill part of the frame they derided this material, saying it was *kuccha*.

Other barriers presented obstacles aside from poverty at the bottom end of the spectrum. Renters too failed to be part of the process suggesting alternative tenure arrangement are not suited for such development. For example, renters in 'A' block were as good as excluded from the Sanitation Project because participation, and the associated investment is more compelling for the homeowner, not the occupant. Other barriers were the confidence in the system and its maintenance. Weariness at the beginning of any venture is a potential barrier which has been addressed by openly designing the sanitation infrastructure in such a way that residents can connect to it in the future. Religion, a lack of legislation, trust and other risk factors also contributed. The Core House initiative discovered that the capacity for participation

by extended families in collective life was limited by religious differences, symbolised in a basic understanding of the material description – columns, party-walls – of private/public distinctions. Even a significant saving on investment was not worth violating these distinctions. This may be a barrier to upgrading, but it says a lot about 'civic culture'.

Scale also presented itself as a barrier; scale meaning the size of the participant group, in terms of the live projects. In the case of the borewell project the street scale worked well, but when trying to initiate the Sanitation Project at the same scale it proved difficult. Street level sanitation (30 families) was difficult technically but also there were concerns such as "this family is larger and will poo more". Essentially a concern about 'free-riding' akin to the problems of cooperation discussed by Ostrom. However, when the project jumped in scale to dealing with a whole block (300 families) issues such as this family being larger, free-riding, and the cost disappeared. What the whole team (author and CURE) concluded was that as the project took on a larger scale, which in turn would change a whole block, it was understood that the overall benefit of collective necessities superseded niggling concerns such as more effluent being produced by another household. So the jump in scale made the project not only technically easier to achieve but included a catchment area of people large enough to collaborate.

The hands on, live project component, revealed particular barriers to incremental construction. Building the Core House not only exposed the limitations of alternative construction techniques mentioned above but offered an insight into what kind of institution building would be required to generate the necessary technical know-how and develop and embed local best practice. Design and building revealed significant shortfalls in technical knowledge and the institutions required to develop building knowledge. For example, the basic lack of understanding of reinforced concrete frame construction resulted in what was meant to be an experimental house being built mostly just like a standard house. The materials available are crucial to understanding what we can call an indigenous modern vernacular. The fact that there were only two types of reinforcement bar sold in Savda Ghevra: one rather thin at 12mm and the other excessively large (and expensive) at 24mm was a significant barrier (and a by-product of the way concrete is used).

Sharing in itself presented one of the most significant barriers to incremental growth. The lack of sharing possible outside an extended family structure as seen in the Core House limited the variations and possibilities that sharing engendered. Shared party walls, doors and corridors all seemingly good ideas were not possible. The horizontal growth in Kalyanpuri and the merging of two homes for the Core House in Savda Ghevra offer important narratives for the incremental Spectrum. Empirical works suggests that the reconfiguration of dwelling arrangements through incremental change was better suited to the extended family rather than a nuclear family structure. As we saw with the Core House an extended family structure clearly lent itself to shared incremental improvements. It was impossible to find two families willing share – even columns – but it was very easy to share between extended families. Sharing columns which significantly reduced the construction cost was not a sufficient incentive to share between two families but it was with an extended family structure; as the Devi family (the core house) were quick to perceive the benefits.

4.2.3 'A' Block vs 'M' Block

If the above two sections reflect generally from survey work this section reflects specifically on the site and survey analysis of 'A' and 'M' Block in Savda Ghevra and Dakshinpuri and Kalyanpuri. Preliminary analysis suggests that incrementalism works best when groups of people are working and living in the area, and thus encouraging an entrepreneurial spirit as in 'A' Block and Dakshinpuri, as opposed to dormitory towns like 'M' Block and Kalyanpuri (figure 4.2). Furthermore, the impact of a diverse group of people (Kalyanpuri and 'A' Block) versus a homogenous group of people (Dakshinpuri and 'M' Block) is less important in creating a culture of incrementalism than the commitment to live and work there with the aim of 'planning to stay'.

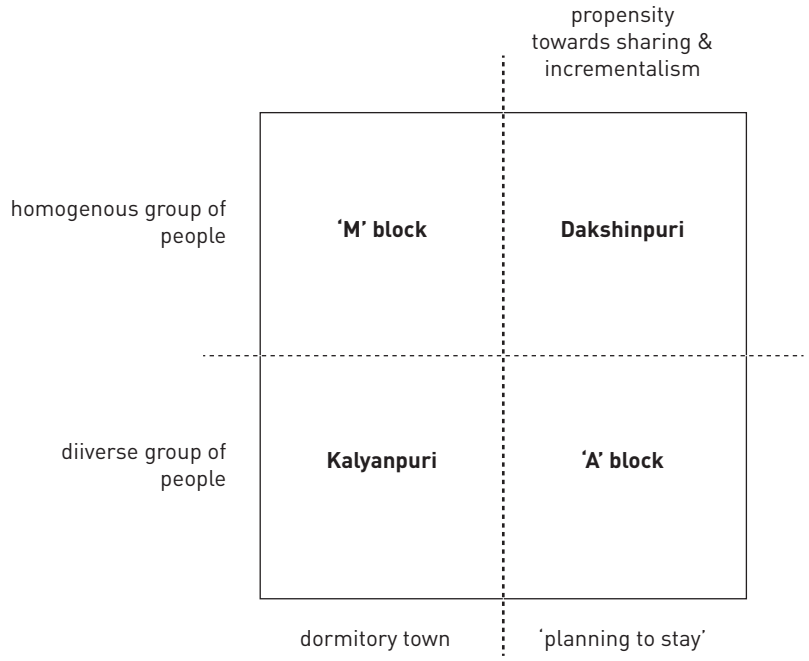


Figure 4.2 DIVERSITY, COMMITMENT AND PLACE-MAKING. The various sites studied were characterised by different social and economic arrangements which had an effect on how incrementalism was used and how effective it was.

In explaining this phenomenon the term 'planning to stay' by William Morrish and Catherine Brown (1994) is useful. The term describes planning as a participatory act of community membership and an expression of belief about the future of one's community. Here Moorish and Brown identify that 'planning to stay' is not just the recipe for the type of place making that results in safer and durable communities but a way for citizens to be part of the processes of local development similar to the 'right to the city' discourse, a claim "to produce the city as well as enjoy it" (Marcuse, 2012, p.35).

Tentative conclusions can be drawn: Dakshinpuri like 'M' Block in Savda Ghevra is predominantly composed of one homogenous group of people which has, at different periods, created a sense of social capital. In 'M' Block one strong group of people created enough constituency working together which was able to lobby successfully for services in 'M' Block which is the only block with a complete drainage system and paved roads (at the time of conducting fieldwork). In Dakshinpuri the residents, much earlier than in Kalyanpuri, created a sufficient constituency and lobbied for services in the form of sanitation drains. However, unlike Dakshinpuri, 'M' Block has developed, in a very short period of time, into a dormitory town which has resulted in limited beyond the basics. The survey of incremental changes

showed 'A' Block to be far more active than 'M' Block, despite 'M' Block's relative wealth, in that most households have a permanent job, unlike 'A' Block. 'A' Block, composed of a mix of people both in terms of newcomers and socio-cultural distinctions (caste and class), shows more investment in the area arguably because more residents live and work there and are 'planning to stay'. Kalyanpuri, like 'A' Block, is diverse, however this diversity has not supported commitment and resembles a dormitory town as people come and go using the neighbourhood as a stepping stone to a more integrated urban life. The commitment shown by 'A' Block is more appropriately associated with that found in Dakshinpuri than Kalyanpuri.

4.2.4 Trust

Whether residents are 'planning to stay', whether they are willing to invest social capital and make a commitment to place raises the issue of trust. State presence in the form of the sanitation infrastructure has an impact on trust, the issue is not so much trust between individuals but trust in political institutions. Arguably there is more trust in a service that can be consumed (a pipe you can poo into) than in a piece of paper which certifies ownership. Trust in a political institution is required to exercise the capacity to understand oneself as an individual within a group with common interests and conflicts.

To understand such trust it is important to distinguish between official institutions, usually supported by law, and the more primordial institutions on which – left to their own devices – most of the residents in Savda Ghevra rely. In between the official and primordial levels are the sort of 'micropublics' referred to by Amin, these are the temporary designations that come together for a particular purpose and potentially vanish (suitable for the kind of interventions reviewed throughout Chapter 3). At all three levels (official institution, micro public or individual partnership) 'trust' is a key element of what is 'civic' as it is an embodiment of what is common-to-all and makes a claim for a kind of morality and ethic.

4.3 UPWARD MOBILITY ALONG THE SPECTRUM

Whether residents try to move out of poverty by engaging in 'planning to stay' or by using a place like Savda Ghevra as a dormitory town, both are moves symbolic of an aspiration for self-betterment. The ambition is to receive the benefits of the city such as housing, education, healthcare understood as freedoms. Doug Saunders (2010a) identifies this condition of being able to engage fully with the city as being a middle class condition, using the analogy of the path towards being middle class as a series of 'steps'. What Saunders describes as "from the mud floor to middle class" (2010b) within a generation is his characterisation of the successful "Arrival City". This definition of middle class is relevant to Savda Ghevra because it is concerned more with 'what it does' than with the financial indices, that agencies like the Asian Development Bank like to use to define middle class, such as the ubiquitous purchasing power parity (PPP[4]). Birdsall' concept of a 'catalytic class' (Centre for Global Development, 2011) is also relevant because it merges the concept of upward mobility with civic and political institutions - such as the Resident Welfare Association (RWA) – requiring enough people with common interests making demands. Banerjee and Duflo (2009) in their analysis of business investments by poor and middle class families highlight the limitations of too narrow a view of development economics if we are to record the movement from poor to middle class through the narrow lens of financial parity.

But, most importantly, what is being identified here are the patterns of living by which the poor can either move out of poverty or be stuck in cycles within poverty. The process of housing reveals quite clearly the impact of incrementalism on development. What Saunders is describing is an idealised trajectory whereby a migrant to the city will start on a 'mud floor' (slum) and through successive improvements, coupled with perhaps a move from a subsistence neighbourhood to a consolidated one, or one along the Spectrum, that a migrant moves out of poverty, towards being 'middle class'. However this is often not a linear trajectory, and is usually full of setbacks.

4.4 CULTURAL, MATERIAL AND PHYSICAL CHARACTERISTICS OF THE SPECTRUM

Whilst barriers, accelerators, class aspiration, push and pull movement along the spectrum, the spectrum also reflects changing cultural, material and physical characteristics of a place. Figure 4.3 represents these changes along the Spectrum, from the *kuccha* shack through to the two-storey *pucca* house at the top end of the spectrum in Savda Ghevra and then including the housing seen in Kalyanpuri and Dakshinpuri. Once again, we confront the significant boundary between the early, self-generating stage of subsistence settlement and the transition into 'town' with nascent civic institutions. The diagram highlights this jump indicated by the dotted red line. The transition from individuals to town with a civic culture is paralleled by the move from a single-storey house to multi-storey house most likely because more space results in an array of improvements and opportunities. Suggesting that more space correlates creative resourcefulness and entrepreneurial spirit which engenders a local civic culture.
The diagram sets criteria by which to identify the cultural, material and physical attributes: washing, cooking cleaning, leisure, privacy (cultural); permanence, and opportunity for expansion and enterprise (material); and finally sanitation, security and water (physical). Because these attributes are often not as simple as being in existence or not, a grey tone is used to signify when the attribute is partially there. Whilst the visual might have originally suggested progressive change over each step this diagram shows a discernible jump that happens when the house makes the transition from single to multi storey. All of sudden a range of cultural and physical attributes are possible that would not have been otherwise. The following paragraphs will illustrate this diagram with some observations from the empirical body of work in Chapter 3.

Figure 4.3 THE CULTURAL, MATERIAL, AND PHYSICAL ATTRIBUTES OF THE SPECTRUM.

4.5 LEGALITY AND POLITICAL CAPACITY ALONG THE SPECTRUM

To put incrementalism to work, home ownership, whether by *defacto* or *dejure* tenure, is a precondition. Home ownership, the symbol of property capitalism, is also a universal (although not exclusively) characteristic of middle class living. However the concern is how a move along the 'Spectrum' is chiefly embodied in building / making as a vehicle of collaboration to make a claim for the delivery of services and infrastructure to support the housing economy. The move along the Spectrum away from subsistence, as it is analysed, is one towards being middle class. The case studies and live projects presented in Chapter 3 show that as normative patterns of behaviour change, sharing becomes harder as a movement along the Spectrum

results in more individualised capitalistic behaviour. For example, washing and cleaning in the street which takes on shared social rhythms with neighbours transforms into taking washing inside and breaking with such a communal rhythm. So although incremental additions offer a better and more stable living environment at the beginning of the process, sharing decreases as one moves up the spectrum, where a middle-class status seems to call for more individualised behaviour.

The clearest example where building / making served as a vehicle for collaboration and the subsequent political awareness was the formation of the RWAs in 'A' Block – bodies that are typically associated with middle and upper class organisation. Historically RWAs have been powerful lobbies supporting slum demolition. Here in Savda Ghevra they have been reinvented as lobbies supporting slum empowerment. Ghertner (2011b, p.506) states "The starting point for most studies of local politics in India is the observation that the modalities through which one can exercise political agency are highly determined by socio-economic status." Ghertner assumes that RWAs only operate as an agent for middle class aspirations when what we see in Savda Ghevra challenges this assumption. Other blocks are following suit and CURE are assisting both 'B' and 'C' block to form RWAs and lobby for services like the Sanitation Project 'A' Block. The establishment of the RWA on the back of the Sanitation Project is an example of what Arjun Appadurai calls "deep democracy" – efforts among the urban poor to mobilise and mediate between the extremes of the typical "world class city" where high concentrations of wealth occur alongside even higher concentrations of poverty, as seen in Delhi. Such mobilisation aspires to reconstitute citizenship within the city (Appadurai, 2002, p. 25). In order to participate in Savda Ghevra the marginalised have managed to create enough consensus and agency, at first via the NGO and afterwards through institutions like the RWA, to negotiate with the prevailing authorities. The making of permanence and densification are key prerequisites for shared incrementalism which often translates into the leverage required, in the form of votes, to secure infrastructure. This process has a long history in India (Chatterjee, 2004; Benjamin, 2004). Such agency can translate into social and political capital whereby cooperation through sharing between individuals results in a collective economic benefit. In the case of the Sanitation Project the shared health benefits translate not only into political awareness capable of creating institutions for long-term consolidation but in the potential for future investment in the fabric of the house because of the improved health of household members.

The role of street leaders and the creation of the RWA in 'A' Block helped the Block and Savda Ghevra as a whole to raise the issue of the lack of adequate sanitation and begin a significant programme of capital investment in a decentralised sewerage treatment system. In parallel to infrastructural improvements the process created a neighbourhood dialogue in which the 'politics of shit' was turned on its head: humiliation and victimisation were transformed into exercises in technical capacity and self-dignification. The role of women has been crucial in this. Women continue to be at the vanguard in explaining the financial benefits of improved access to sanitation. This is most apparent in the all-women operation and maintenance team who are responsible for the long term management of the project and are the first port of call for residents wishing to connect into the system, for interested parties who all want to know what it would cost, and what the benefits are. The ability of the residents to reconfigure difference, to enable shared investment, is an example of the concept of 'micropublics' (Amin and Thrift, 2002) operating in Savda Ghevra. For Amin 'micropublics' are not just about shared spaces for encounters but sharing that requires some kind of membership, requiring individual (often financial) investment, which invariably requires some form of institution.

These 'micropublics' – such as the RWA - become part of the metabolism of Savda Ghevra, an institution predicated on resolving differences to facilitate resolute action, a contribution to civic order and identity. This ability to resolve difference is at the core of a city's identity. In the words of Stuart Hall, "the capacity to live with difference is, in my view, the coming question of the twenty-first century... we must pay attention to the ordinary or small politics that emerge within everyday life, and consider whether it reconfigures our understanding of class, community and kin" (Hall, 1993, p.361).

The above analysis of the Spectrum presented multiple and overlapping layers that animate a process of making of permanence; physically, politically, socially and institutionally.

4.6 CONSOLIDATION

Sharing and incrementalism lie at the heart of the elaborate process which I have characterised as 'consolidation' along a Spectrum. All human conglomerations are composed of various forms of shared institutions and networks with implicit and explicit rules. The case studies and live projects are concerned with spatial contexts as receptacles of consolidation and so represent architectural forms of sharing and incrementalism. A cluster of houses investing together results in 'consolidation': the making of permanence both physically but also politically and socially (which later includes the possibility to cultivate 'privacy' once 'middle class' is reached). The physical consolidation of the house structure with its more permanent materials and its attendant water and sanitation services becomes the basis for political consolidation because as neighbourhoods collectively invest in their homes, making financial and time based investments into the 'place', a form of commitment and collective presence is established which translates into political and social institutions.

Important examples of consolidation from the research are as follows:
(a) The Sanitation Project
The Sanitation Projects accomplished something collaboratively which, in turn, has collective significance. Whilst housing cannot be separated from services what emerged from the practical process of the Sanitation Project was that infrastructure implies state presence, and this was embodied in the Permission Letter (Figure 3.3.6) which was laminated, and placed in a public place. What was also seen was that a whole housing economy has been triggered since, this was after the permission was received and in particular since work began on site. The housing economy is in part triggered by a desire for an in-house toilet but also because the arrival of sanitation symbolises the presence of the state, with which comes various forms of legality. As houses consolidate, the hypothesis is that this creates not only a unified collective presence and voice, but that the *pucca* physicality of the community puts more pressure on the Municipal Corporation of Delhi (MCD) to deliver better services and make demolition harder.

(b) The Mother Dairy kiosk
During resident interviews the Mother Dairy kiosk was, like the arrival of sanitation infrastructure, perceived as state presence and thus a de facto form of tenure based on perceived legitimacy of Savda Ghevra by the state. Mother Dairy kiosks throughout the city of Delhi have become a symbol of legality because they are seen as a formal institution.

(c) Savings Groups to support housing economy
Anjali- who lives in 'A' Block - runs an informal savings group (one of many in Savda Ghevra) where the loans are directed towards house improvement. She described how she runs a

rather large network of women who pool together funds to help out other women, mostly poorer women, because their husbands have lost work due to resettlement. She clearly articulated the collective benefit of lifting poorer families out of poverty: from *kuccha* to *pucca* houses.

(d) The Residents Welfare Association
As households consolidate they mobilise themselves politically and socially to make claims to the benefits of the city. Consolidation marks a point where the marginalised become citizens who can begin to make these demands on the host city as well as contributions to its economy and ethos. The clubbing together to form the RWA – as a lobby for improvements – represents the transformation of local needs into political processes.

(e) House to neighbourhood upgrades
The move along the Spectrum is an important stage in the process of consolidation and the collective creation of 'town' and civic decorum through house-improvement and infrastructure development, this involves several stages from the house to the *gali* (street), neighbourhood and eventually the city. 'Town' is made by the addition of shops, diversity of tenure (rented accommodation) supported by infrastructure (water, sanitation, and electricity) which in turn signals the advent of civic decorum. Already, at the early level of consolidation achieved during the sanitation project in Savda Ghevra, which is well below the levels of consolidation found in Kalyanpuri and Dakshinpuri, there is a political voice at the scale of town which, in turn, is an increment of the city scale. That is, consolidation of a settlement into a participating increment of the host-city is not a purely 'bottom-up' process, not a simple aggregate of improved individual dwellings to which institutions are attached; rather city and settlement growing together. The question now becomes how can we engender this transformation along the Spectrum?

The process of consolidation, with the above example in mind, will now explore why this is important based on two critical themes:

i The relationship between incremental infrastructures and the state.

ii The way this relates to ideas and the discourse of legality. Including '*pucca* aesthetic' and legality as an aesthetic to be distinguished from a liberal property right enshrined in law and the effect of this as preventing demolition.

4.6.1 The relationship between incremental infrastructures and the state

In parallel to these infrastructural improvements the process of the sanitation project created a neighbourhood dialogue in which residents became politically engaged in urban life. This is most apparent in the all-women operation and maintenance team who are responsible for the long term management of the project and are the first port of call for residents wishing to connect into the system. But also the establishment of the RWA, both examples of what Arjun Appadurai calls "deep democracy" are efforts among the urban poor to mobilise and mediate between the extremes of the "world class city". The RWA was the first of its kind in a slum resettlement colony in Delhi.

RWAs are typically associated with groups of upper and middle class private property owners. Asher Ghertner has done extensive work showing, perhaps ironically in the current context, how inner city upper class RWAs were one of the many drivers for the push to eradicate slums and the eventual creation of places like Savda Ghevra. RWAs are institutionalized spaces that facilitate and mediate relations between the neighbourhood residents and government (municipal) authorities. Here, it is critical to recognize the importance of CURE as an intermediary, or as a representative, in the way that they facilitate or help produce a parallel structure of political representation that exists alongside the notably absent cast of usual suspects. Absent are the political parties and party workers that are often found on the ground negotiating with municipal bureaucracies particularly in relation to the demand by residents for basic infrastructure such as water and sanitation.

This interplay between finding a political/civic voice and services was also recorded in Kalyanpuri and Dakshinpuri – where the arrival of sanitation played an important part in how both colonies have developed since the 1970s. Collective incremental investment in housing in these two resettlement colonies resulted in the discernible formation of neighbourhoods which are distinct, but part of the fabric of the city; strengthened by infrastructural networks such as a sewerage connection and water supply systems.

In order to participate (in the city) the residents of Savda Ghevra managed to create enough consensus and agency, at first via the NGO CURE and afterwards through institutions like the RWA, to allow the process to proceed; a process which is still on-going. However, given the location of Savda Ghevra, this raises the concern that for the lower classes to realise that their citizenship they have to occupy peripheral spaces; begging the question as to whether these same types of politics could happen in the core of the city, not just on its periphery? Regardless of this question, this kind of politics is important because, the aggregate of individuals is often the opposite of 'community', and the idea that there is an intermediate condition - found in a temple, hair salon, or sanitation system - needs to be acknowledged.

4.6.2 The way this relates to ideas and discourse surrounding legality

What emerged from the practical process of the Sanitation Project was that, seemingly, infrastructure implies state presence. The housing economy is in part triggered by a desire for an in-house toilet but also because of the confidence this inspires in assuming greater *defacto* tenure. The urbanist Mathew Gandy records similar conditions with water in Mumbai – where, with water infrastructure comes various forms of legality. The suggestion is that as houses consolidate this creates not only a unified collective presence and voice, but that the *pucca* (well built) physicality of the community puts more pressure on the municipality to deliver better services and make demolition harder. And again Asher Ghertner's work, specifically his discussion of tenure diversity, is important here. He talks about how legal and illegal are not the only categories, or even the most predominant categories of tenure through which people are dwelling in cities (in India). In fact there are all kinds of legitimate (and legal) ways in which people are living in cities, you have customary tenure, minority rights meditated through political representation, various tribunals and legal pluralisms and the argument that he makes is that this kind of multiplicity of tenure is what keeps these spaces from removed from the property market. And in fact enables low income neighbourhoods to exist in the city. So there is an investment in keeping something not quite capitalized, not quite part of the legal market so that capital can't enter, speculators can't enter. The critical point here is that the *'pucca* aesthetic', as legality, is to be distinguished from a liberal property right enshrined in law; and the effect of this preventing eviction, demolition and clearance.

Because, arguably, all cities grow incrementally I am concerned with a particular kind of incrementalism defined by this process of consolidation. Consolidation, is beyond the process of densification, in that it requires the autonomous individual to reconcile themselves within the consolidated whole, and be part of that collective whole. The process of consolidation is the collective creation of 'town' through house-improvement and infrastructure development, which involves several stages from the house to the *gali*, neighbourhood and eventually the city. 'Town' is made by the addition of shops, diversity of tenure supported by infrastructure (water, sanitation, and electricity) which in turn signals the advent of civic decorum. Studies of informal settlements have long noted the ability of residents who inhabit marginal and peripheral land to create shops, restaurants, and factories that generate and create local economies, culture and networks that often also provide links to the city as a whole. Incrementalism in its purest form is a way of participating in city making. Already, at the early level of consolidation achieved during the sanitation project in Savda Ghevra, the political voice at the scale of town is, in turn, an increment of a voice at the city scale. That is, consolidation of a settlement into a participating increment of the host-city is not a purely 'bottom-up' process, not a simple aggregate of improved individual dwellings to which institutions are attached; rather city and settlement growing together.

Preliminary conclusions can be drawn that the incremental town consists of groups of individuals which are representative, to some degree, of a larger mass. These groups emerge and strengthen as the town grows. For there to be representation, a discernible idea of a town, a civic culture, needs to exist and from that emerges implicit and explicit codes of how to live, socialise and participate. Civic culture also allows for conflict to emerge as those who do not want to participate oppose that which is more concrete. The culture of participating and building, such as the addition of a shop, is an active marker of that transformation. The transformation of Savda Ghevra from a series of empty plots to something with its own urban culture is marked by the physical presence of new institutions such as the daily market which now attracts residents from outside the colony. Entrepreneurship is at the heart of incrementalism. The move from temporary inhabitation by small increments to permanence is felt not only by the individual household but by the overall fabric of the town – as the investments go beyond the door into the street: from a family bound culture limited to the dwelling place to something approaching a full set of civic institutions.

Starting with a Spectrum of stages, and then defining consolidation as a claim for permanence the following section presents the final principle conclusion that there is a potential limit for the effective use of resident-led incremental methods.

4.7 THE 'SWEET SPOT'

It is not known the extent to which Dakshinpuri and Kalyanpuri were developed by the residents themselves as opposed to contractor-based operations. In addition, it is not known how much of the older resettlement colonies were developed by outsiders buying-in and the resultant implications for the development of an urban metabolism. However, based on the empirical work a conclusion can be drawn that there is a 'sweet spot' where sharing and incrementalism can be most effective to drive improvements. The following section will analyse this 'sweet spot' which lies loosely between the transition to becoming a multi storey house and prior to individualised behavioural patterns at the top end (figure 4.4).

Figure 4.4. THE 'SWEET SPOT' ALONG THE SPECTRUM.

At the poorer end of the spectrum *kuccha* dwellings are usually too basic to form a foundation for improvements; whereas moving from the semi-*pucca* to the *pucca*-plus stage can be made to happen more easily. At the other end of the spectrum, when a house reaches two storeys, improvements and additions tend to be done by a contractor, indicating an inherent limit to resident-led incrementalism. Contractors all buy, hold and speculate on land, much like developers. Speculator-held land, whether held as an empty land bank or for rental accommodation, decreases its potential for incremental growth and therefore contribution to the advent making of town and civic culture through the incremental route. The middle, dominated by single-storey *pucca* structures, is the ideal housing type to deploy sharing and the incremental approach as a development strategy. This middle zone or sweet spot between semi-*pucca* and *pucca* (multi-storey structures) appears to be where incremental sharing is the most effective in raising residents out of poverty to a point where they are able to take significant advantage of what the city metabolism has to offer.

The sweet spot in the case of Savda Ghevra was put into practice because (recalling figure 4.3) houses in the sweet spot have many of cultural and material attributes along the spectrum but not the physical ones. The Sanitation Project offered a clear example of this where residents who did not have the finances to have individual solutions but were making investments in their homes were the primary drivers behind the initiative. The sweet spot is an interim between subsistence and capitalist society when people become more individualised, and, in the context where there are limited freedoms (Sen, 1999), sharing and incrementalism can be a way or method for the marginalised to participate in the city and propel the poor into middle class living. The research here suggests that, in the absence of the state and/or market, 'sharing' becomes a mechanism for the disenfranchised to locate themselves in the changing city and to frame their own aspirations, leveraging and negotiating urban boundaries in an attempt to frame their collective and individual desires. Sharing and incrementalism become

a mechanism for improving dwelling conditions, safety, durability and increasing community solidarity. These in turn become a mechanism to construct opportunity, to participate and remove the lack of freedom associated with poverty. Examples from Chapter 3 include: the shared borewell, the shared grey water pit, the shared sanitation infrastructure, the shared superstructure in the core house, and the shared rainwater harvesting.

The review of incrementalism in Savda Ghevra in Chapter 3 reveals a significant distinction between the early stages of self-generating a subsistence settlement - Turner's focus (mentioned Chapter 1.4.3) - and the transition into making a 'town' with its associated nascent civic institutions. Whilst the incremental self building reviewed in Chapter 3 in Savda Ghevra resonates with the self-help revolutions of the 1970s, the incrementalism within the sweet spot, as identified in this thesis, is more concerned with town-making through the decorum and emergent civic institutions associated with sharing the step-by-step process of house improvement with other citizens. There are a range of networks of support required for the delivery of housing when the state is not involved and when the beneficiary does not receive a whole home but rather is responsible for the delivery of the home by moving along the Spectrum (figure 4.5).

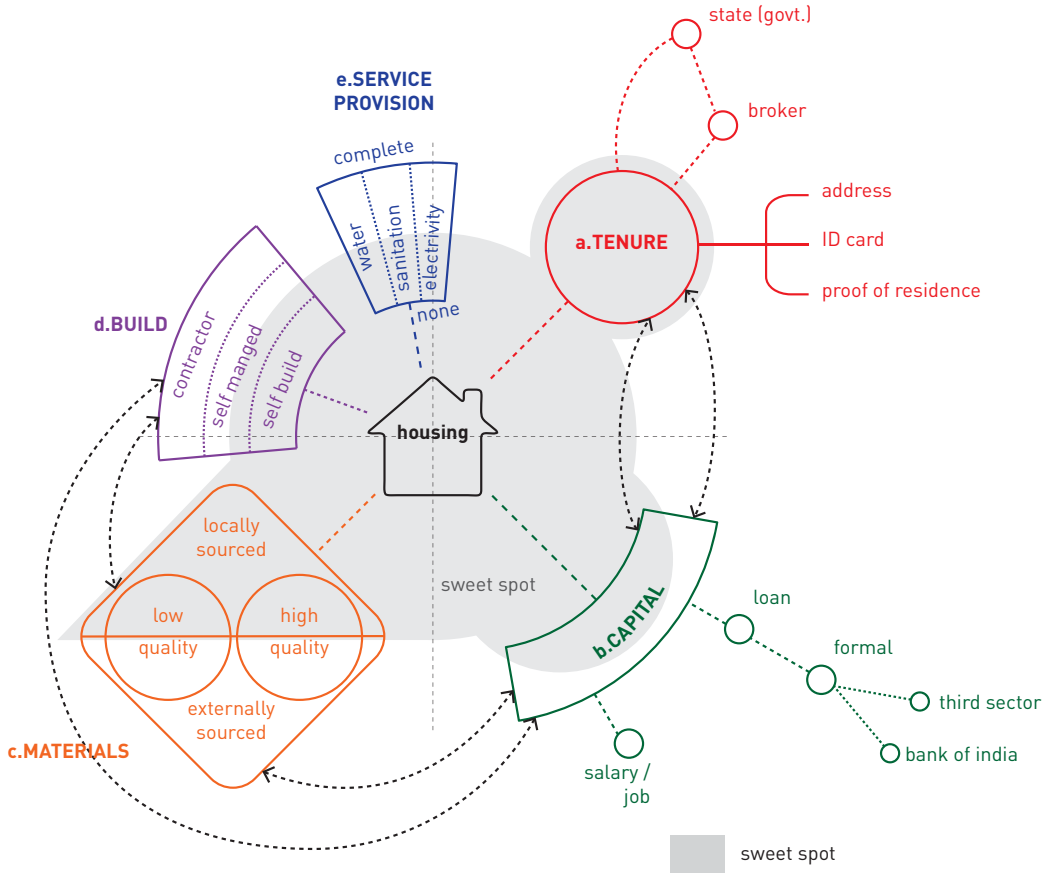


Figure 4.5 RANGE OF NETWORKS INVOLVED IN THE DELIVERY OF HOUSING.

Figure 4.5 reduces this to five networks of support:
(1) Tenure
(2) Capital (financing)
(3) Materials
(4) Build (construction)
(5) Service provision (water, sanitation, electricity)
All of these play varying roles over the course of changes across the Spectrum. Furthermore each network of support has its own pair of thresholds defining where and what the sweet spot is, each of which helps clarify the opportunities for sharing and incrementalism within it.

Tenure has already been identified as a prerequisite for incrementalism to be put into action (Chapter 4.3). Whilst (a) tenure is, indeed, a basic building block, but, in isolation, it is not enough. In order for incrementalism to be put into action residents need access to (b) capital to make investments. They also need to feel secure that these investments won't be lost – for example, from the fear of eviction and demolition, and trust in supporting institutions. Access to finance requires either a secure job or some kind of loan from informal or formal systems. Once finance is secure incrementalism is put into action through (c) materials for improvements and the process of building with these materials. Incrementalism best works when locally sourced materials can be used so that there can be small scale innovations, alterations and local adaption to complex and shifting environments. This works best, as we saw with the ferrocement objects, when people can alter, tinker and adapt what they build; and it is an impediment when resources are limited, such as the lack of variety in local reinforcement bars and how this was a barrier when building the Core House. Incrementalism is also best put into action when the resident is in control of the process or the construction (build) is self built (d). Once construction is undertaken by contractors then this signifies middle class individualism and/or property speculation and this implies a decreasing opportunity for sharing in the incremental process. In addition the contractor approach is one-stop and limits the opportunities afforded by piecemeal construction. Finally incrementalism is also best put into action when there are partial or no (e) services and the incremental addition of services is when there is the most reward in terms of incremental collective action. The combination of tenure, access to credit, local materials, self-build construction and partial services is the sweet spot where sharing and incrementalism can be the most effective form of development.

4.7.1 The Sweet Spot where common overrides individual

The research presented in Chapter 3 showed that incrementalism and sharing prevailed within transformations from a state of basic subsistence to one of collaboration and conviviality, followed by individualisation. This middle zone or sweet spot fostered a condition where the commitment to a common good overrode individualised behaviour. The case studies and live projects in this thesis present examples of what Elinor Ostrom found when researching the decisions taken by the public when offered choices relating to the consumption of common resources that 'individuals with common interests [would act] voluntarily to try to further those interests – and that the benefit [accruing to that] group would be sufficient to generate collective action to achieve that benefit' (Location 190 of Ostrom). For example, in Savda Ghevra the common demand for sanitation overrode individualised behaviour. Those families which had already built cesspit tanks perceived the benefit of collective action and were the first families to sign up to connect to the shared infrastructure. Sharing also enabled those families who couldn't afford individual cesspits to participate in the potential for dignified sanitation systems by participating in the proposed framework and its enabling process. Another example was the

borewell case study where a cooperative structure was put in place whereby the street shared the incremental addition of a borewell.

In both cases the collective action, which at first appeared to be a the subject of purely social arrangement, organised within the family or as part of a 'buddy' system or networks of cohorts based on ethnicity, age, gender and religious ties, inevitably acquired a political dimension. This was particularly the case as conflicts developed, either within the settlement or between the settlement and the existing civic authorities. The state, as represented through the MCD planned Savda Ghevra on the assumption that the delivery of potable water to the settlement by tanker and the need for residents to watch out for this delivery, collect the water and carry it home would be suitable and sustainable. This type of water supply is based on the assumption that water consumption will be reduced because it has to be carried to the home. However, this assumption made no allowance for the rising expectations of residents who make investments in their homes and lifestyles. As a consequence the infrastructure has been overtaken by events and in many cases can no longer sustain or support those incremental investments. The example of the lined pit in Chapter 3.4.3 is neither a sustainable solution nor a good one as it contributes to ground water pollution; but it is a reflection of the inherent resourcefulness and creativity within the community to address a common problem.

The issue of water access raises a common concern in relation to the sustainable long-term use of natural resources used by many. The escalating ground water pollution in Savda Ghevra is a classic example of Garrett Hardin's expression 'the tragedy of the commons' (Hardin, 1968) used to symbolise the degradation of the environment to be expected whenever many individuals use a scarce resource in common, without the necessary trust to establish shared institutions to guard against such pollution. But by forming such institutions as the RWA, geared to the solution of shared problems, Savda Ghevra residents were able to avoid this tragedy. The process of transformation from illegal squatter to citizen involves unlearning certain customs and rhythms based on inner city slum life and a lot of social learning within the new environment. Sharing ideas becomes a moral discipline. Arjun Appadurai, when discussing sharing within savings groups in informal settlements in Mumbai, writes, 'The practice builds a certain kind of political fortitude and commitment to the collective good and creates persons who can manage their affairs in many other ways as well. Daily savings, which don't generate large resources quickly can therefore form the moral core of a politics of patience' (Appadurai, p. 11). Similarly the arrival of the sanitation infrastructure turns the 'politics of shit' on its head: humiliation and victimisation are transformed into exercises in technical initiative and self-dignification, decorum, and the structuring of common purpose. Proper adherence to a pragmatic code of behaviour agreed to enable the shared use of resources converts easily into a shared horizon of collective responsibility leading to the acceptance of moral codes. These 'codes' may be explicit, such as the membership fee to connect one's household toilet to the infrastructure, which involves agreeing to use the system properly. They may also be implicit as is the case when recognising that one must look after the environment when the community has mutually invested in something. Another example is provided by the shared waste collection project in Savda Ghevra. As there is no municipal regular waste collection, there is the collective problem of the dumping of waste in public open spaces. Hence the waste collection project, where a community tries to live appropriately and with decorum, is an individual response to a collective problem.

A successful outcome in turn establishes the principle that collective commitment and incremental techniques can build a town. Instead of demanding from the city or state

often inadequate and certainly expensive 'services', there is an important place in the early history of a resettlement colony for collaborative building of the primary connective tissue or infrastructure. A *gali* is the result of an aggregate of individual houses, but a sanitation system refers to the anonymous whole that is 'town', at the level of primary necessity. There is a direct connection between physical and political collaboration as the means for attaining the general health and decency that is necessary to consolidate the identity of Savda Ghevra as a 'town', as a properly empowered increment of Delhi.

4.7.2 The sweet spot and the role of the researcher in live projects

The methodology whereby the researcher is embedded in a local context also forms part of defining the sweet spot. Figure 4.6 overlaps the 'sweet spot' with the diagram which originally described the role of the researcher over time. Now the role of the designers, researcher and other stakeholders are overlaid to suggest when they are best put to use to support the sweet spot.

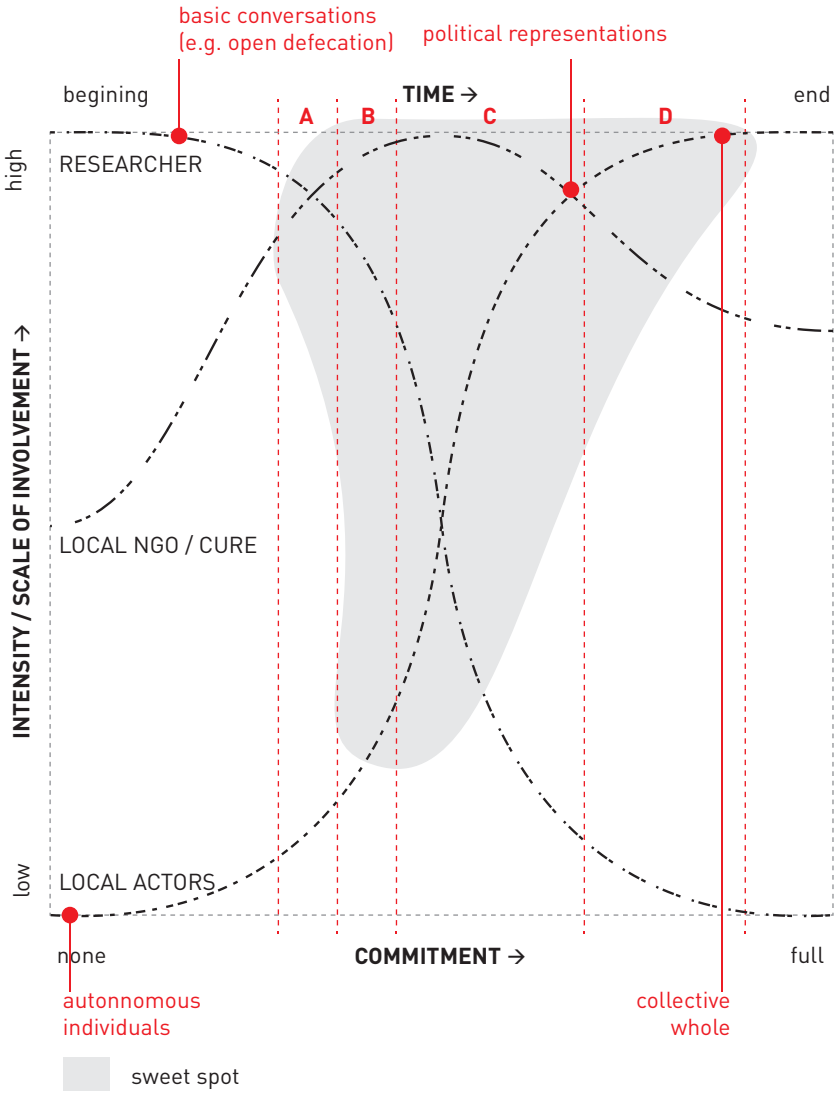


Figure 4.6 THE SWEET SPOT VERSUS TIME, INVOLVEMENT AND COMMITMENT WHEN RUNNING A LIVE PROJECT.

The sweet spot is bound by three conditions marked on the diagram as 'A', 'B', 'D' and dominated in the centre by 'C'. 'A' marks that period where a project is beginning with the involvement of designer / architect / engineer or similar such as the author, engaged with a local NGO, such as CURE. 'A' is that period where design-action-based research platforms for dialogue are established. 'B' follows shortly after 'A' and represents the residents or the community participating in, or engaged with the discourse surrounding the project. Community meetings, such as the ones done in the sanitation project, *puja* ceremonies and the ferrocement workshop are all examples of this type of engagement. This 'participatory' line of local actors in the diagram is not linear but rather exponential, as a successful project will create a critical mass which accelerates participation. 'C' is the junction point between initiation (beginning) and when things start to run by themselves, it is that point where an aggregate of individuals come together, understanding mutual commitment. By the end of the sweet spot, 'D', the residents or the community are fully engaged in the process and institutionalised politics of 'civic' order or 'town' and have taken over the project. In the case of the sanitation project the establishment of the operation and maintenance team and the RWA are symbolic of this stage. Once there are institutions and the project no longer becomes something of concern – such as when sanitation moves from defecating in a field to having a toilet in the home – individualised behaviour resumes and opportunities to put sharing and incrementalism into action are reduced.

What emerges in this diagram is the problem of collective necessities. For local actors to start seeing themselves as autonomous individuals within a collective whole, they need to perceive themselves as a group, together, sharing a civic culture for such collective necessities to be installed. But, once these necessities are installed, then it becomes just another anonymous service and individualism enters – which would be represented once one moves away out of this diagram. How to expand this sweet spot - past the diagram – would be grounds for further research. The operation and maintenance teams suggest that the sweet spot can be extending around these procedures; used as tools to expand the reach of the service and further connections with the city. The sweet spot is where residents have the means to produce community infrastructures but not the middle class prioritised values that transcend them. If this is a continuum, then how do we reconcile the 'politics of shit' with the capacity to aspire? Or, what are the ways of being in the city that do not have bourgeois citizenship as their final object?

4.8 FINAL REMARKS

The urban topography of Delhi is delineated by various periods of India's past from the Mughal period (1526-1707) through British colonial rule (1858-1947) to post Independence (1948); and in this sense, Delhi, like all cities, has grown incrementally. However the term 'incremental', as used here, addresses what is best described as 'civic', and the argument here is that there is a relationship between the topography of the city (its structure of differentiation) and the quality of civic life, where civic life is understood to empower, or to disempower, people politically through conflict / negotiation / accommodation / collaboration. In other words, in the incremental city there is the capacity to see oneself involved with, committed to and in solidarity with one's place or town. For this to happen 'place' needs to be visible within the city, providing a scale or horizon within which people can orient themselves (experience) and commit (engage). And so here we arrive at one of the key elements of the concept of incremental, and that is the architecture, both in its making and in its substance as a vehicle for structuring the difference that allows 'place' or 'town' to emerge as the setting for civic.

The movement from fear/ shame to political confidence is the embodiment of collective life and how to commit. The live projects showed how the tactics of making-town-through-building was a vehicle for, and of, collaboration. Ultimately commitment-to-town is the goal. The question will be whether Savda Ghevra develops slowly enough, so that the residents can engage with shared incrementalism, not too slowly so that it stagnates, but also not so fast that middle-class ideals take over, thus removing these opportunities for sharing in the sweet spot before other equally meaningful sweet spots have been discovered within the emerging city topography. Slowing down the rate of change of urban topography, it has been argued, is critical in facilitating the ability of the less powerful residents to engage with and build the world, their world. However, unlike rural settings that already have a slower pace of change (though arguably this can be disproved), urban settings tend to have much more dynamic land markets, citizen flow and interaction. In this, infrastructures and people can arrive quickly dependent on the market and policy conditions. This can create a new temporality, that can be in conflict with the slow moving and high social investment process required by community-led planning and maintenance. And also because of the close proximity of these sites, the infrastructures can foster jealousies with adjacent, under serviced sites - issues that present a point of departure for new work.

However there should also be room to critique the practice of community participation-led infrastructure design. The material motivation is undoubtedly noble: to provide basic infrastructure to a peripheral marginalized space. But it raises a few questions with regards to the project to date, and scope for further research: Do these infrastructures and the formalization of property benefit the most vulnerable populations or do they potentially kickstart a gentrification process which further marginalizes the "beneficiaries"? Do the local actors have a way of defining the incremental infrastructure themselves? Do they conceptualise it or resist it? In urban literature and debates there is often a silence about for whom these processes are being designed. And perhaps an even more critical question is: Does this kind of incremental infrastructure relive pressure on the state; Does it let them off the hook, at best, or worse still, produce a legitimate internal urban infrastructure for second class urban residents? Is the scheme's operation sustainable beyond the initial "hand-holding" stage? Because how can a purely public infrastructure be sustained without putting a burden on the community's social capital, time or monetary resources? The initial costs of infrastructure are high, and they require further sunken social costs to sustain themselves in community-led contexts. Thinking, via the practitioners lens, pragmatically, one has to approach the intervention as a temporary incision. The highest degree of involvement is in the design of the infrastructure, which in itself lock the conditions and processes of maintenance.

As large cities become more populous, and the centre is progressively gentrified, pushing to the periphery the people and their activities who cannot afford the centre, the urban culture dissipates into a topography of serviced well-being in which the potential for civic participation by the poor becomes either an ever-receding horizon or a matter of establishing local towns within the comparatively thin periphery. Standing back at this scale the meta question is ultimately what (and who) is the city for? It is a place where 'it is every man and woman for themselves'? Or is it a place where we all come together? What is it that we are all aiming for? Is the city a mechanism to get people into a capitalised system of work, or is the city a mechanism for creativity, which requires a certain element of chaos? Is the end game sharing economic richness? Creativity? Or the social good? All opportunities for further research. The learning-by-doing approach, the process of workshops and building, is promising not because it promises free and inspiring designs contesting inequality, but precisely because it is

willing to get tangled up in the laws and politics and polices of everyday life. The shared practice of incrementalism – of design installation - is necessarily embedded in the practices and production of place making. True to such a promise the empirical work describes the difficulty of putting in place a community demanded shared sanitation infrastructure on the ground and in the attempts to do so confront a range of obstacles: the technical difficulty of off-grid solutions, the narrowness of the *gali*, funding and governmental approval. The method suggests that any approach that privileges one over the other is obviously missing something.

FOOTNOTES

1 INTRODUCTION

1. The term 'slum' (full of pejorative connotations), in this paper, refers to what is locally called *jhuggi-jhompri* (J.J. for short) which are settlements characterized by precarious living and housing clusters. Officially, and for planners and the judiciary, 'slums' are illegally occupied land and so referred to as squatter settlements. Slum areas designed under the Slum Improvement and Clearance Areas Act of 1956 under Section 3 are eligible for benefits despite being seen as illegal (DUSIB, 2013).

2. Since medieval times, Delhi has been described as a 'city of cities' – an urban patchwork made up of various components, each of which is thought to bear the imprint of a distinct social, cultural and architectural identity (Dupont, 2000). Shahjahanabad was the last of the 'seven cities' with Lalkot being the first, followed by Siri, Tughlakabad, Jahanpanah, Forozeshah Kotla, and Purana Quila that stood on the same ground as the ancient legendary city of Indraprastha. Today one can trace three distinct phases of planning which have contributed to the political and urban landscape of resettlement colonies in Delhi today; (1) the preceding cities of Delhi – Shahjahanabad (1865) and Colonial New Delhi (1911-1940), the former being the product of the Mohgul Empire with its cultural origins lying in India and extending into present day Afghanistan and Iran, the later colonial city, the product of the British Empire with its origins partly in western Europe (mainly England) and partly in India; (2) the post-colonial city (1947) led by the 'dynastic' rule of the Nehru-Gandhi administration, a product of indigenous nationalism within the walls of the British institutions left behind; and (3) finally the current city under construction, the product of an Anglophone empire with its cultural origins partly in post-colonial India and partly in the US (King A, 2004).

3. The emergency period took place between the 26 June 1975 and 21 March 1977, when the Indian Prime Minister, Indira Gandhi declared a state of emergency.

4. According to the current Building Bye-Laws (c.2010) the minimum plot size with ground coverage not exceeding 75 percent, shall not be less than 40 sq m in small and medium towns and not less that 30 sq m in metropolitan cities. Plot sizes below 30 sq m but not less than 15 sq m may be permitted in the case of cluster planning, however, in such cases the ground coverage and FSI shall be 100 percent and 2 percent respectively. In mega-cities it [plot sizes] may be further reduced to 15 sq m. In such cases where plot size is below 25 sq m only cluster planning or group housing may be adopted. However, in case single room tenements are required to be provided where future additions are not possible, the carpet area of multi-purpose single room should be at least 12.5 sq m. In case of slum resettlement on the same site, the minimum area may be reduced to 12.5 sq with potential for adding another 12.5 sq m on first floor with an internal staircase.

5. The incorporation of family planning policy linked the allocation of plots with sterilisation which left a long lasting negative impact by association.

6. There is much literature on the discourse of urban improvement through sports mega-events to the benefit of developers at the expense of displaced populations. See Amita Baviskar "The Commonwealth Games" for an extensive analysis of the effects of both the 1982 Asian Games and the 2010 Commonwealth Games on Delhi; Catalytic Communities (http://catcomm.org/) for research documenting displacement in anticipation of both the upcoming 2016 Olympics and World Cup in Rio and for London 2012: *Ground Control* by Anna Minton (2012).

7. There is no exact figure for the number of relocated families. Because slum demolitions by the Delhi Development Authority and the Slum Wing of the Municipal Corporation are notoriously under-reported. A conservative estimate by the Municipal Corporation is 710,000 however private consultants estimate the figure is more like 1.8 million (Ghertner, 2008).

8. Savda Ghevra is planned to house 20,000 families or plots which would be around 120,000 people in total.

9. Tewari (2011, pp. 20) describes the planning and management of Delhi, "Metropolitan Delhi has a complex structure of municipal administration. The National Capital Territory of Delhi (NCTD) includes areas that are administered in tandem by the Central Government, government of NCTD and three municipal bodies, viz., Municipal Corporation of Delhi, New Delhi Municipal Corporation and the Delhi Cantonment Board... While the government of NCT-Delhi, Delhi

Development Authority and Municipal Corporation of Delhi are responsible for planning the city, the task of regional planning has been entrusted to the National Capital Region Planning Board (NCRPB). The National Capital Region (NCR) covers an area of 30,242 km^2 including 1,483 km^2 (4.4% of NCT-Delhi, 4,493 km^2 of Rajasthan state, 10, 853 km^2 of Uttar Pradesh and 13,413 km^2 of Haryana state). The area includes the fringe of NCT-Delhi as well as a number of other towns falling within the region. Thus the region has a very complex administrative structure with overlapping fringes, towns and rural areas from three other states, and is obviously, very difficult to plan." Savda Ghevra is within the NCT-Delhi area and is currently what would be classified as the urban fringe of peri-urban. Savda Ghevra is very much defined by the problems associated with the fringe which emerge primarily from its proximity and close link with the formal city centre and secondly from the well-recognised fact that it is considered as a part of the town in future' (Dikshit, 2011).

10. The full extent of slum demolitions is difficult to assess with accuracy as the Slum and J.J. Department of the Municipal Corporation of Delhi (MCD) has not published consistent data. Even the above list provided by the local MCD office misses slum clusters identified during survey work, notably: Laxmi Nagar 8, Geeta Colony 8 and Sultanpuri.

11. While Savda Ghevra exists it is understood within the lens of informality in that the housing, services, infrastructure and employment are accessed outside of any 'formal' mechanism. Although the binary of formal and informal is lacking especially in a context like India where - if we are talking about informality and formality in its original reference which was about economics (Joseph Stiglitz) – the two are so entwined. However, it should be noted that although Savda Ghevra is partially planned, it exists informally but not completely outside formal processes.

12. The Delhi Jal Board is the water authority. *Jal* in Hindi means pure water unlike the ubiquitous term *pani* which is often used. The emphasis on pure means it is drinkable.

3.1 FERROCEMENT; MAKING SMALL SCALE CHANGES

1. This was a period when Italy suffered a lack of iron and steel, a period called the *autarchia* (meaning self sufficiency); Nervi (and other engineers such as Riccardo Morandi) developed techniques of concrete construction that required less steel such as ferrocement.

2. More accurately ferrocement is wire-reinforced cement-mortar, the defining feature being a very dense mesh of woven or welded reinforcing wire throughout the entire object. The wires distribute the load uniformly over the entire surface preventing a concentration of load.

3. http://www.youtube.com/watch?v=5r5qMlQUqDw

3.2 CORE HOUSE

1. The term 'Core House' has not been coined by the author but is a term used to describe an incomplete housing solution. Other phrases include starter, grow, transitional, owner-driven, phased, step-by-step, staged, minimum, shell and incremental. There are differences between the types. A "shell" house consists of only a roof and floor as oppose to a 'core' house which is partially or fully enclosed and includes basic services and fixtures. Unlike site and service schemes which provide bare serviced plots all these types include some form of structure which lays the foundation for home-building.

2. The Sir Dorabji Tata Trust (SDTT), one of the oldest, non-sectarian philanthropic organizations in India, established in 1932 with the prime purpose of encouraging learning and research in the country, of meeting costs of relief during crises and calamities and of carrying out worthwhile charitable activities. The Trust's vision of constructive philanthropy has been sensitive to the fast-growing needs of a developing nation, while the work initiated by it holds contemporary relevance as it continues to support innovative enterprises in development.

3. Although city dwellers for over 3 generations the Singh family have strong ties with their ancestral village. Like most migration to cities, based on village networks, Veenita is from the same village as the Singh family and

so a good "match". The fact that Mitlesh, a previous slum dweller, now was a homeowner made him an attractive groom for Veenita's family who arranged the marriage with Mithleshs parents, Girja and Surender.

4. Plots in Savda Ghevra once issued by the state have to be inhabited with some form of construction within three months of issue. Many families who have decided not to live in Savda Ghevra but have not sold their plots or people like Mithlesh who was living with his neighbouring aunt and uncle build a temporary cheap 'house' in order to comply with this rule and maintain ownership over the plot, being wary, at the same time, of encroachment by neighbours.

3.3 SANITATION PROJECT : PIPE DREAMS

1. Section 3.5.1 will provide a more detailed description of the plot sizes.

2. Whilst conventional sewerage might one day arrive at Savda Ghevra this option is currently excluded because without significant intervention which is not forthcoming from the state this is prohibitively expensive limiting the options to decentralised low cost systems suitable for a medium density peri-urban community and so requiring local operation and maintenance (forms of sharing). Alternatively many low cost decentralised sanitation technologies rely on percolation – where the soil cleans the waste – because of the high density of Savda Ghevra and the high water table this is not possible limiting decentralised low cost options to the use of septic tanks and shallow sewers.

3. For a more comprehensive analysis of the design see Appendix 2 for a complete drawing package.

4. The Sir Dorabji Tata Trust (SDTT), one of the oldest, non-sectarian philanthropic organisations in India, established in 1932 by Sir Dorabji Tata with the prime purpose of encouraging learning and research in the country, of meeting costs of relief during crises and calamities and of carrying out worthwhile charitable activities. This is the same organization who put forward the funding for the construction of the second water kiosk (Core House).

5. The financing model involves residents paying for the toilet plus household chamber and connection to the manhole themselves,with the rest of the system privately funded.

6. Construction and upgrading a house to include a toilet requires large lump sums that the poor usually do not have in savings, ranging between Rps. 5000 – 10,000 (£60 – 120). The inability of formal housing finance institutions (HMFI) to offer credit to slum households impelled partnering local NGO CURE to expand its Livelihoods Credit Model in Savda, with wider applicability. The fundamental approach is to top up household savings through easy, customised credit at low interest rates – lower than the 16-20% charged by HMFIs. Carved out of a Project Grant and member contributions, the Community Credit Fund (CCF) is managed by a community committee. Applications are reviewed by the community, and based on project viability the money is lent. The community is responsible for ensuring the payback that is usually delayed to allow families to shore up their savings.

3.4 WHAT PEOPLE SHARE AND DON'T SHARE IN SAVDA GHEVRA

1. *Jal* means water in Hindi, with a connotation of pure (clean) water as opposed to *pani* which is just water.

2. Figure taken on 10th September 2013

3. Originally the kiosk was imagined as a community space – one where people would come to collect water and socialize – much like the infamous *dhabba* shop or the ubiquitous Mother Dairy Milk Kiosks. However unlike food and milk – water, in the quantities needed is too heavy and inconvenient to carry. The result is that the kiosk acts more like an infrastructural hub rather than participating or promoting convivial living in Savda Ghevra.

3.5 INCREMENTAL: WHAT IS INCREMENTAL IN SAVDA GHEVRA

1. There is little information available on the way the Municipal Corporate allotted plots. It is known that there was an effort to group people from the same slum pockets together. However there was no consultation on the process resulting in the mixing of class, caste and religion.

2. In accordance with the Delhi Building Bye-Laws under section '1.3 Parking Spaces' the minimum area for each car park space for open areas is 25 sq m (Puri, 2010, p. 35).

3. Figure taken 28th July 2013 online at http://www.rupees2pounds.com/

4. The alternative policy of relocation to apartments in low rise towers will be explored later in this chapter when Bawana is discussed.

3.6 INCREMENTAL: WHAT IS INCREMENTAL IN BAWANA, DAKSHINPURI AND KAYANPURI

1. Thakur (2011, pp. 172-173) describes the urban fringe as that which handles the conversion from rural to urban land as the city grows; he notes that Delhi in particular, because there is no physical barrier around the city, had expanded rapidly in a haphazard manner. He characterises the Delhi urban fringe as lacking administration, planning and resources resulting in poor development with inadequate infrastructure resulting in depletion and degradation of the environment.

4 ANALYSIS & CONCLUSION

1 This figure refers to only the site and service resettlement colonies studied and not Bawana as there is no incremental growth there.

2. Figure taken 20th December 2013.

3. Since 2009 there has been an increased awareness of toilets, hygiene and a women's right to access safe sanitation as a result of a toilet campaign spearheaded by the Total Community Led Sanitation Campaign which began in Harayana, India. Campaigns such as "no toilet, no bride" have caught the imagination of the public with now many walls adorned with slogans such as *"Na byahun beti us ghar mein, jismein na ho shauchalaya"* or 'won't marry my daughter into a household which doesn't have a toilet' (Divya, 2009).

4. Purchasing power parity (PPP) is a conversion factor that shows how much of a country's currency is needed in that country to buy what $1 would buy in the United States. (world bank: http://www.worldbank.org/depweb/english/beyond/global/glossary.html)

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