

Factors Behind The Formation Of Vibrant Complexity In The Slum Environment

Vikrant Singh

Shri Ram School of Architecture
Shri Ram Group of Colleges Muzaffarnagar,
India arvikrant@gmail.com

Abstract—The constant increase in Urban Slums during last few decades has become a serious concern for many countries across the globe. This can be seen as a parallel expansion along with the sudden & unexpected growth in Urbanization. Even after continuous efforts of Rehabilitation and improvement, the problems associated with it has been continuously growing and have now reached to an alarming stage in many fast developing economies such as India. Though, we cannot deny that situation here (India) has improved by the earlier efforts but unarguably they have not been substantial or appreciable and the problem is continuously increasing. This has generated a need for the better understanding of existing situation (Slum) before suggesting the proposals for their improvement. The paper, therefore, aims at understanding & identifying the factors that plays a key role in the overall working mechanism for such settlements. It begins with the development of basic hypothesis that it is the regeneration of that active and dynamic life of the original settlement into the improved surroundings which is necessary to increase the probability of success for rehabilitation projects. For the identification of most accurate factors, two different slums from different cities were selected and a survey in the form of a questionnaire was carried out. These survey responses together with the figure ground plans of both the slums are carefully analyzed to identify those factors which contribute to the formation of that Vibrant Complexity, which is the soul of such settlements. At the end, these identified factors are also analyzed with the problems observed in the earlier unsuccessful attempts made by the concerned authorities. This analysis too has resulted into an interesting correlation between them that further strengthens the authenticity of discovered factors.

Keywords—urban slums; rehabilitation; vibrant complexity; regenerate

I. INTRODUCTION

With the charm of providing better employment opportunities and lifestyle, Cities have always been an attraction and a major reason for the growth of urbanization. During the last few decades, migration of population from rural to urban areas has been tremendous (United Nations, 2007). Simultaneous increase in urban issues such as deterioration in environmental and living conditions, poverty & social inequality and most importantly Slums have raised the critical doubts on the capability of nations worldwide to cope up successfully with this sudden growth of urbanization

and expectations of people involved in it. Gravity of the problem can be understood from the factors that constitutes it and are listed by United Nations (2007) as the overcrowded & congested living conditions, security concerns, health problems, lack of education, social problems of crime and violence (The World Bank, 2004), etc. Since, these listed issues have an adverse effect on the growth & overall prosperity of a nation, therefore, the strategy to tackle with these becomes a very important issue for them to ensure consistency in their progress and development. The situation is even more daunting for developing countries such as India which itself accounts for around 17% of the total slum dwellers population in the world. Its major economic Centre Mumbai has the concentration of more than 5 million slum dwellers (United Nations, 2007). Therefore, to take up this challenge to transform India as a slum free nation is gaining a huge momentum during last few years. Earlier unsuccessful attempts and wide criticism for slum rehabilitation programmes offered by the government has also generated serious questions on the pertinence of approach and methods employed so far to deal with this dangerous issue and moreover on the credibility for their future proposals.

The problems observed in initial failed models led the government to shift their policy from onsite¹ to offsite² rehabilitation but even that has resulted into the Poverty Recycling and selling of property by the slum dwellers rather than an attempt meant for their betterment. Apparently, at a point of time this had given a huge support to the viewpoints that onsite rehabilitation projects have a greater probability to generate positive results but more recent proposals in Mumbai for giving incentives in terms of increase in FSI to the developers, who take up the work of onsite slum redevelopment, is generating a lot of criticism for being more political and profit driven decision (Patel, 2010) rather than an act meant for social development and as a result people have refused to vacate the site and therefore, this again raises a critical doubt on the later thinking of onsite rehabilitation to produce more successful solutions.

¹ Onsite – When the improvement work is done on the same site.

² Offsite – When people are made to shift to the new site with improved conditions

This rejection of both onsite as well as offsite redevelopment have not only made the situation even more difficult but have also generated the need to understand the problem from fresh perspective. These earlier failures have exposed the concerned authorities' superficial understanding of actual existing situation in the slums and also their lack of foresightedness. In fact, this has perpetuated the need to understand and identify the other hidden & more crucial factors that have the potential to achieve most successful solution to this ever growing problem of urban slums.

In the earlier attempts, there is clearly an indication of the lack of thorough comprehension of that complexity from the slum environment which is considered to be the soul of such settlements. An art historian (Panofsky, 1968) while criticizing modernism for being extremely simple and devoid of natural feel has also emphasized the importance of such complexity in environment to enhance the experience level attached with the particular spaces. Without surprise, as a consequence of various omitted factors that have had the potential to revive that experience or complexity, previous attempts have failed to capture and recreate that original essence in the environment which could have transformed the projects to another level of success. In recent times theories have spoken about this error of some left out factors in approach and strongly validated the inclusion of other disciplines (Salama, 2011) to develop a better proposal for affordable housing. Another famous theory developed by Bolay, 2006 has perpetuated the need of 3-track approach in dealing with the problem of slum rehabilitation, criticizing the recent attempts that just concentrate on either on the resettlement or moving people to developed housing. It through the support for onsite and with the involvement of residents in redevelopment also highlights the importance of retaining those strongly captured images of spatial and experiential sequences in the minds of inhabitants that helps in maintaining the natural complexity and community living of the settlement, which are very often cited as the reasons for the rehabilitation schemes been unsuccessful.

Preceding discussion has led to the hypothesis that emphasizes the need to identify the factor(s) that can stimulate or encourage the generation of that natural feel & complexity of the original environment into the proposed surroundings, which is very important to sprout the spatial and experiential vibrancy that further defines the individuality and uniqueness of these respective settlements. If the rehabilitation is done incorporating those factors along with previously identified concerns, project shall have a more probability of being successful no matter if it is done onsite or offsite.

To develop this hypothesis, the paper begins with the critical understanding of what complexity is in slum environment and how & in what sense it is important for the rehabilitation proposals. To understand these complexities in itself & to identify those factors that contribute to its working & formation, two different slums were selected (explained in Appendix) for the study. The precise survey questionnaire (attached in Appendix) is prepared keeping in mind the kind of information that is required to be gathered. On the basis of responses to the survey & figure ground plans from both the slums some common factors are identified and the hypothesis is advanced. The identified factor(s) are also analyzed with the problems associated with earlier rehabilitation projects to determine if there is any relationship between the two, presence of which can further validate the authenticity and

importance of discovered factors.

II. VIBRANT COMPLEXITY AND ITS IMPORTANCE

In Slum context, vibrancy is basically formed by the variety of activities and functions performed by the dwellers throughout the day especially in the external or common spaces. Jan Gehl (2010) in his book cities for people, while talking about life in open spaces also highlights the importance of open/outdoor spaces & activities associated with them particularly in areas of high density & low economic resources (low-cost social housing in developing countries). It also provides inhabitants with virtual feel of being with the people or amongst the people at most of the times and therefore promotes a kind of liveliness & psychological safety and keeps them away from isolation/loneliness. Complexity on the other hand, is a product of the haphazard (apparently speaking) growth of the particular settlement, precisely physical such as street patterns, dwellings of different dimensions & areas, etc. Consequently, this complexity together with the vibrancy generates those very effective images in the minds of its inhabitants which are needed to be resuscitated in the improved environment (proposals) to make people easily & comfortably settled in the new surroundings without being sentimentally hurt & dissatisfied. This transition of resettlement if done smoothly can produce surprising results. If people are provided with those similar images that they already have strong impressions about in their minds, there is a strong possibility that they will quickly get used to and comfortable with them since then they will find the common link to relate with and the entire process could be lot smoother. Kevin Lynch (1960) too has strongly spoken about those images that one carries in their minds about their spaces and its importance.

Like everyone else, slum dwellers too have strong spatial and social images from their settlements in their minds. Their bonding with the randomly grown streets (as it may seem to the external people), common spaces, certain nooks and corners, interaction with the neighbours through small windows, variety in the physical pictures (elevations & peculiar details on the façade) generated because of uncontrolled and non-systematic development, lineage of functions to engage in, etc. is so strong that if they are provided with something which is more ordered and systematic but lacks the element of that original feel and variety, they end up not being connected and comfortable with it and would rather feel as if rooted out from somewhere to the no mans' land. There is this vibrant complexity that exists in the settlement which needs to be revived in the rehabilitation projects to make them more successful. The famous American writer and activist Jane Jacobs (1961) while criticizing 20th Century American urban planning has also spoken about the importance of such feel which is related with the community living & joint activities. On the contrary the solutions that have been offered so far were mostly medium to high rise buildings that automatically reduces the amount of functions & thus vibrancy level which otherwise would have been attached with the horizontal sprawl

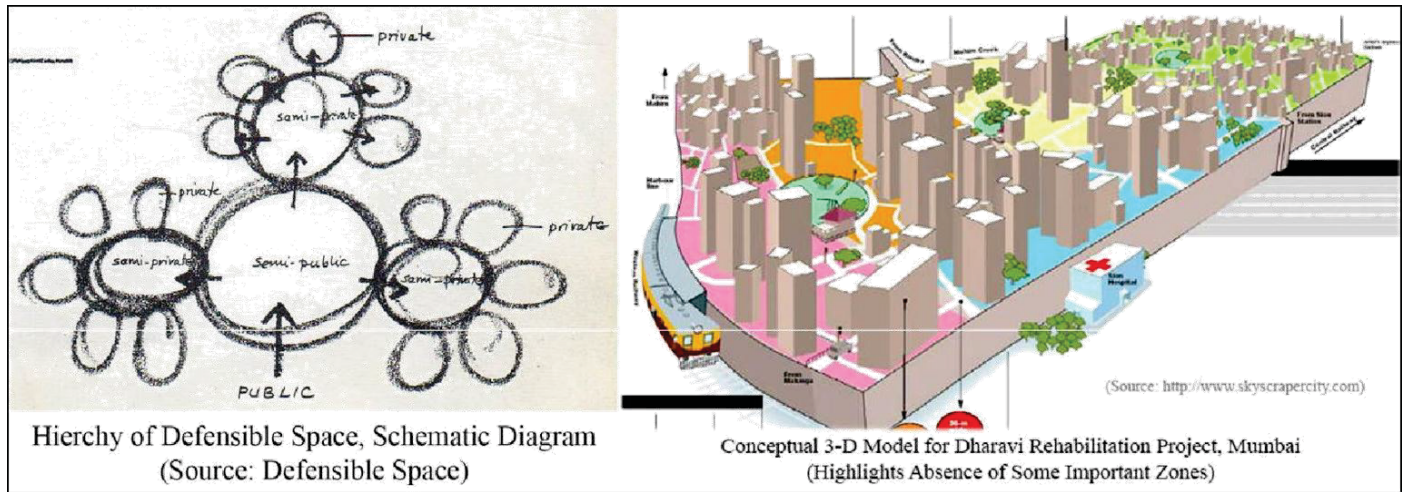


Fig.1

Oscar Newman in his book defensible space (1972) also talks about those various layers necessary for ensuring an element of safety in space and criticizes high rise residential (Vertical) for not having semi-public space in between semi-private and public space (Refer Picture 1), that not only makes it very unsafe and unhealthy for the community living but also reduces the variety of functions and experience quotient with spaces which is also cited as one of the major reasons behind the rehabilitation schemes being unsuccessful. Jean-Claude Bolay (2006) has suggested a 3-track approach in dealing with the problem of slum rehabilitation. It suggests that rather than just moving people, slum rehabilitation schemes should focus on developing the better conditions and lifestyle within the same area by considering and approaching the problem through 3 factors and one of those factors is to evaluate the various resources (human, economic, etc.) available in the zone and putting them to the appropriate use while suggesting the rehabilitation, has again emphasized the need to retain the original complexity by keeping the economic functions /activities alive in which people very often indulge. There is a need to not only understand this complexity but also to identify the factor(s) that results in its formation. Therefore, there is a requirement to identify that common link or guiding factor that perpetuates this vibrant complexity.

III. FACTORS BEHIND THE FORMATION OF COMPLEXITY

Before the introduction of those identified factors that contributes in the development of that vibrant complexity in the slum environment, it is worthwhile to understand what reasons usually leads to the formation of slums & their gradual spread because that will help to discern the strong connection that exists amongst them.

Various reasons cited by the UN-Habitat, 2003 for the generation of slum includes the rapid & enormous migration of people from rural-to-urban areas, increase in urban poverty & inequality, insecure tenure and globalization. One thing which is common in almost all the reasons is to do to with the employment & economic opportunities. Either Cities have not been able to keep their promise to provide better opportunities & lifestyle to every migrant or the growth has been so sudden that the concerned authorities & infrastructure facilities were not ready to cop up with it. Whatever has been the case but the result has been terrible and the people who could not earn much were not left with any other option but to reside in the areas where nobody else can even think of living. As per statistics, provided by the National Sample Survey Office (NSSO) in 2010, out of the total slums in India 24% are along drains & 12% are along railway tracks while others are also in the similar areas of deteriorated or degraded nature. Such areas become more susceptible to these settlements because they provide their inhabitants with not only the psychological security for never being removed from there but are also free with almost no maintenance cost as they are in most cases the left out or unused lands. It is their **need** to survive in the city with a hope to make it big one day that led them to dwell in such areas. It is this **need** only that further gives birth to various activities and spaces within the slum settlement that makes it more lively, vital and complex. Survey responses have also underlined the importance of how everything from physical patterns to variety of performed functions on the streets is connected with the factor of **need**. Let us discuss those factors one by one to understand the working mechanism that binds the respective settlement together with a strong impression of its own. These factors can also be conveniently classified under social, economic and physical categories.

IV. STREET PATTERN

Streets are the lifeline of any settlement and a house for lot of activities. Their character and pattern has a huge contribution in developing the complexity in the environment. With the help of figure ground plans for the selected slums and survey outcomes, some very strong observations are recorded. Though, at superficial level it is hard to see the

existence of any order/system of growth or any common link between the street patterns of both the slums but when related with the responses of questionnaire, some striking similarity can be seen. There is a strong relationship between employment locations of the dwellers and street patterns. The similarity in the presence of employment opportunities around both the slums have played a vital role in the identification of that probable order which guides the formation as well as growth of any such settlement.

Streets tend to grow in the direction that either leads people to their working locations or are the short-cuts to reach there. Even in certain layouts door openings have supported this relationship. Secondary Door tends to open towards the street that is a shortcut to reach their employment destination. In fact, the survey has also proved that majority of the population is employed in the nearby areas within the range of 0-2.5 km (Graph -1). Therefore, streets do look random at first but are the result of strong need to commute comfortably on foot (free or cheapest medium) to their place of work in the least time possible. Even most streets being diagonal or tending to diagonal (Refer Figure 2) gives a huge support to the finding as diagonal length is the shortest length if we compare it with the sum of length of other sides in a triangle (Refer Figure 1), square or any other polygon for that matter. Since, regular grid do not offer that advantage of shortcut routes that is why settlement drifts to grow along the traces of initially used short cuts (mostly diagonal paths) on the vacant land to reach the employment location. As considerable part of the population has their employment locations in close proximity and have to travel to their work place several times a day, thereby, their need is obviously to keep their travel distance to the minimum to make it more comfortable and economical.

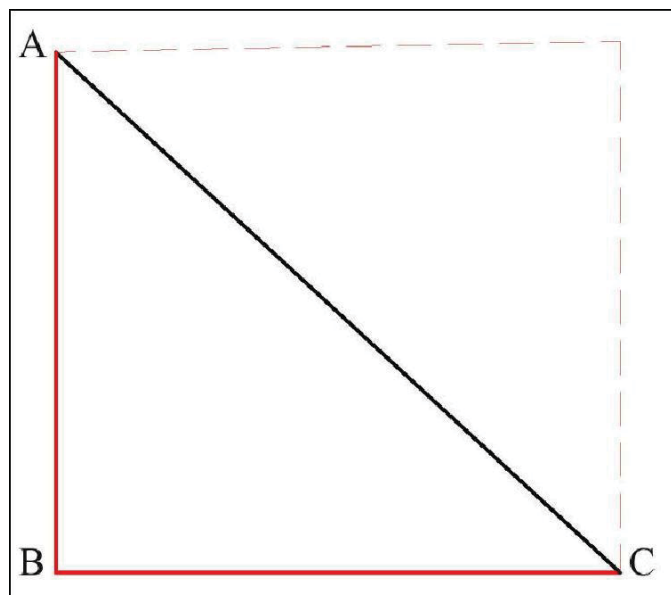


Figure 1

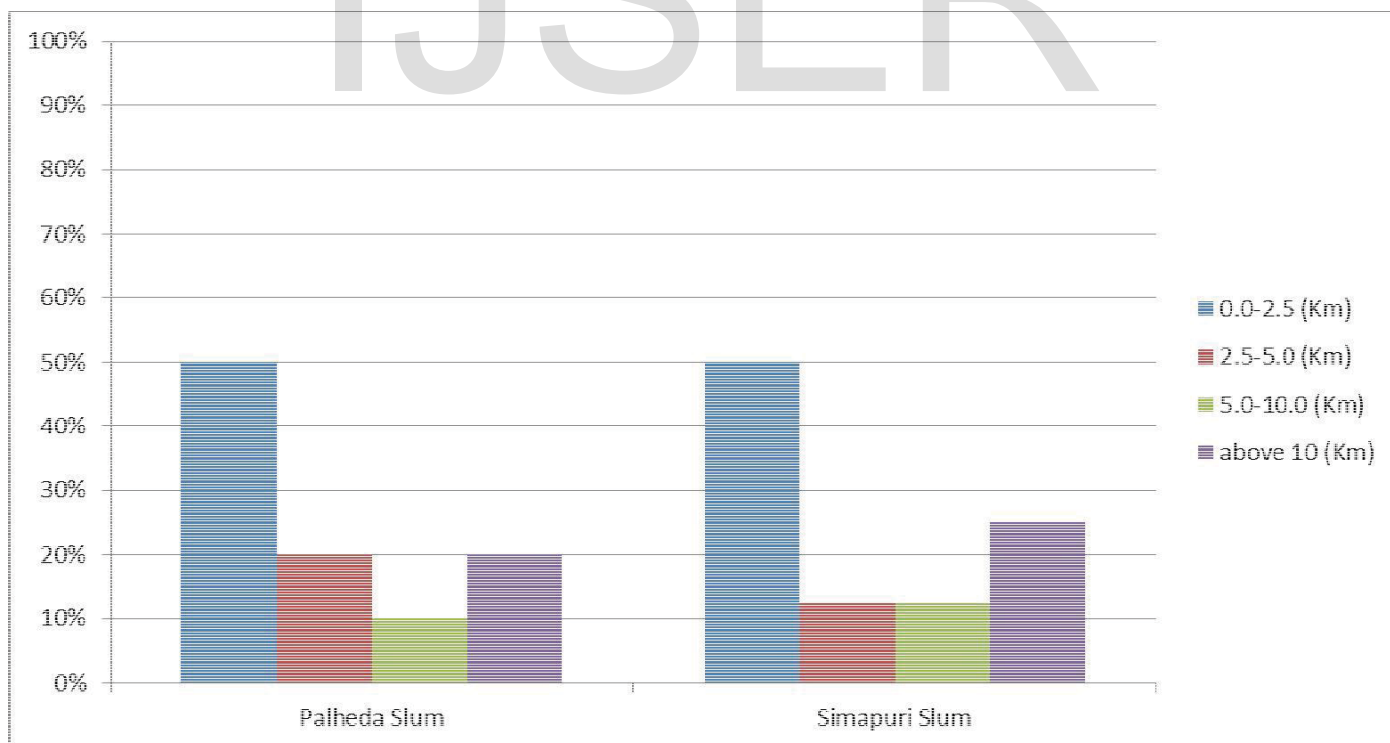


Fig 3. Graph 1 Percentage of Population & their Employment Distance



Figure 3 (Representing the Diagonal street pattern and employment locations)

V. LIFE IN EXTERNAL SPACES

Various activities done on streets brings a kind of life to the settlement and are responsible for playing the role of a performer not only to entertain the audience (residents) but also to leave an everlasting impression on their minds. These activities are mostly performed by the dwellers themselves for

their need of survival. They vary from small shops to impromptu interaction spaces to kids playing and seniors watching them, etc. If we look at it from vibrancy aspect, few people are involved in performing them while others are busy in watching them (Refer Picture 3 & 4).

Fig 4



Since, dwellings have a lot of such problems that makes them almost inhabitable and reduces their comfort level that is why people are inclined to spend majority of their time in external spaces. Survey has also validated the statement by showing the value of ratio of time spent in internal to external spaces mostly in the range of 0.5-1.0 (Refer Pie Charts Below). Also, many people are dependents (Graph-2) they find no other place than being on streets and talking to people as their simplest way to spend time.

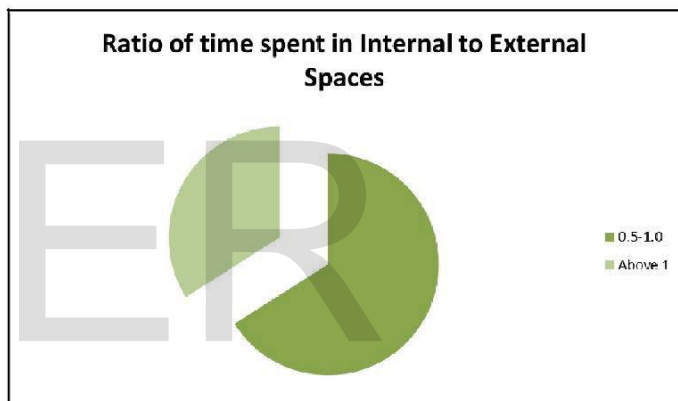
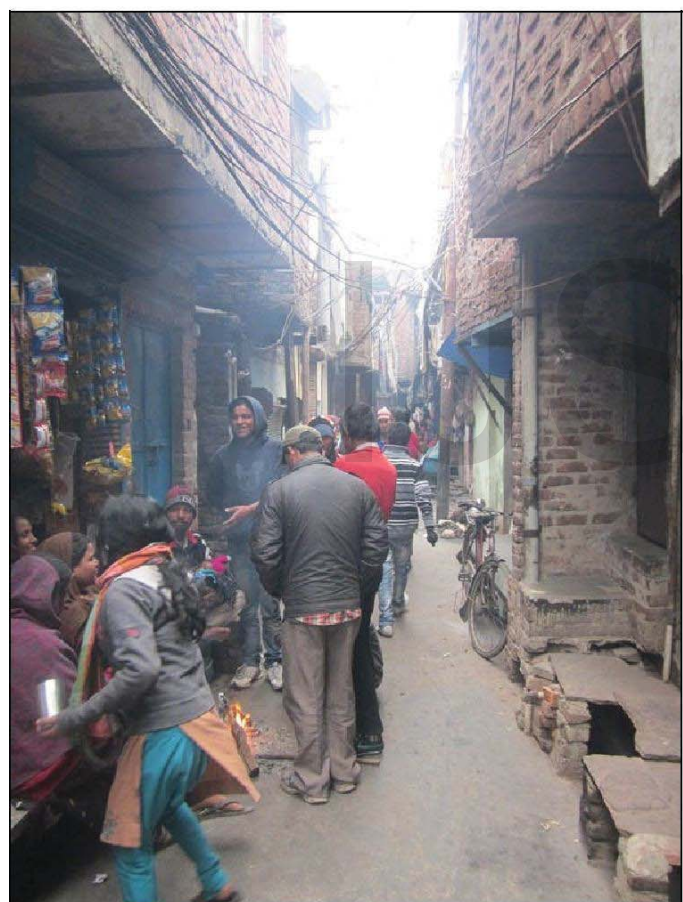
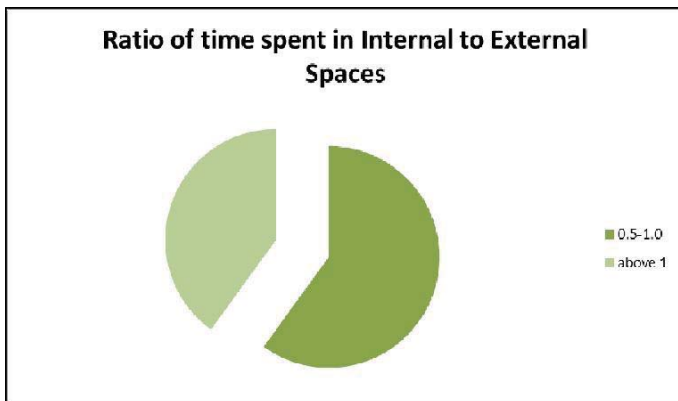


Fig 6.

Before the introduction of those identified factors that contributes in the development of that vibrant complexity in the slum environment, it is worthwhile to understand what reasons usually leads to the formation of slums & their gradual spread because that will help to discern the strong connection that exists amongst them.

VI. OVERLAPPING OF SPACES/COMMON SPACES

Because of the scarcity of necessary resources and services, dwellers are compelled to share various spaces and services with each other. As per the data gathered through Survey, dwellings lack supply of some basic services such as pipeline for drinking water and people have to share hand pumps & similar mediums located at certain places within the settlement to sustain their needs. Survey has also shown evidences of dwellings sharing common spaces. Few shared spaces can be observed within the settlement & meant for all while others are between immediate neighbours. It is again the outcome of their **need** which requires them to be cordial not

Fig 5

In this way, everyone is captivated and a part of active community life rather than being isolated and leading a private introvert life. Survey response has put forth the importance and need for the existence of such activities and requirement of people to engage in them. Survey has strongly highlighted the poor status of natural light and ventilation as almost every dwelling that is included in the survey faces the same problem.

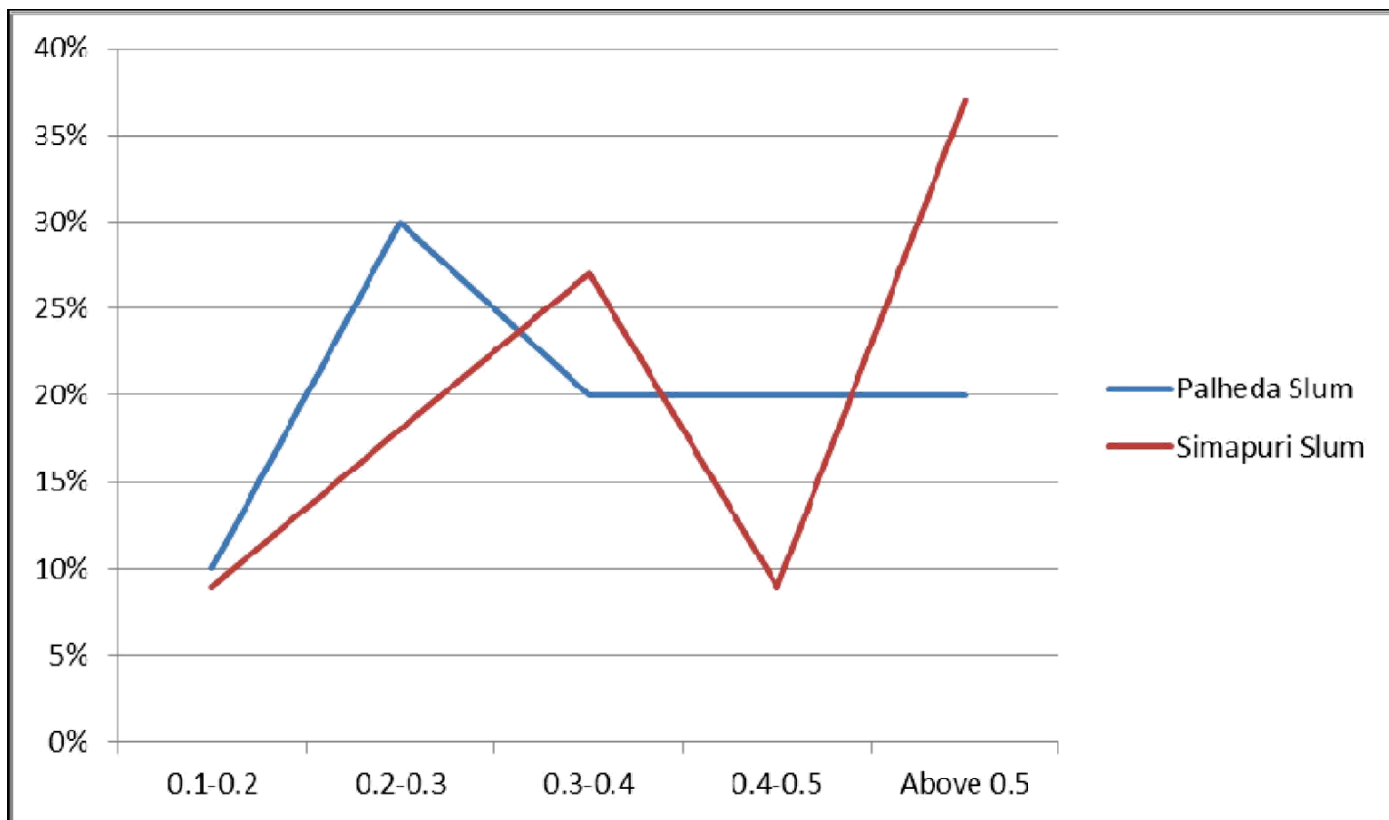


Fig 7. Ratio of Earning to Dependent Population in both the Slums only with their immediate neighbours but also with everyone

in the settlement at large. Survey too has revealed similar results as almost 80% of the people surveyed in both the slums expressed good relations with their immediate neighbours. Such activities either done voluntarily or involuntarily helps in promoting the concept of living together in harmony and helping each other from trivial to serious issues of day today life and thereby subconsciously develops the emotional bond amongst them (Refer Picture 5 & 6).



Fig 8 (Palheda) – People sharing space & working in Groups well-being and even offers their suggestions and advice for their betterment. These



Fig 9. (Seemapuri) – People sharing space & working in Groups

Through the statistics gathered for young kids and working parents, proved that very often because of work pressure, people need to leave their kids under the watchful eyes of their neighbours (Refer Picture 7). Their dependence on each other for many reasons imparts lot of strength to their experience of living together as a Community. Survey has shown that people possess less privacy level amongst themselves as their dwellings are closely situated next to each other and in almost all cases shares at least their two walls (Refer Picture 8). Socially, there isn't much hidden from each other and they live like a big family. People very often because of their culture, involve in the matters pertaining to their neighbour's well-being and even offers their suggestions and advice for their betterment. These are again some of the



Fig 9. : Kids being watched by elders



Fig 10. Dwellings closely situated next to each other (Simapuri Slum)

functions/activities that facilitates strong bond amongst residents and promotes community living.

Survey has also shown religion as the dominant factor over the settlement. One of the slums surveyed is dominated by the Hindu population & the other by the Muslim population and as a result one settlement has temple into it while the other is marked by the presence of mosques. It shows people prefer to reside amongst the people of same religion because it not only helps them to settle quickly and comfortably with them during the initial stages but also make them feel safer.

VII. FORM & PROPORTIONS OF STREET

Ratio of width of street to height of dwellings along it has a strong influence on the psychology of users. Many scholars have spoken about this relationship and its impact on the minds of their users. Famous academician Cliff Moughtin (2003) in his book *Urban Design: Street and Squares*, has also asserted the importance of form and proportions in street & their implications and mentions that streets should form a virtual enclosed space i.e. the initially mentioned ratio should be 1 (should not be more than 2.5) to provide a psychological comfort to people for being safe and not being lost in the infinity. It gives them joy of being with everyone and of active participation in the functions that are continuously going on there. Survey has shown strong deviation from that ratio in one of the slums surveyed (Refer Figure 3). Though, people feel congested in those streets but safety amongst residents can be observed from the pictures that depict kids roaming on those streets all alone (Refer Picture 9).

The Survey has also revealed that streets become even more active when combined with media of interaction (Windows, Doors, etc.) that are used through the dwellings and width of street in particular. Gathered data has provided

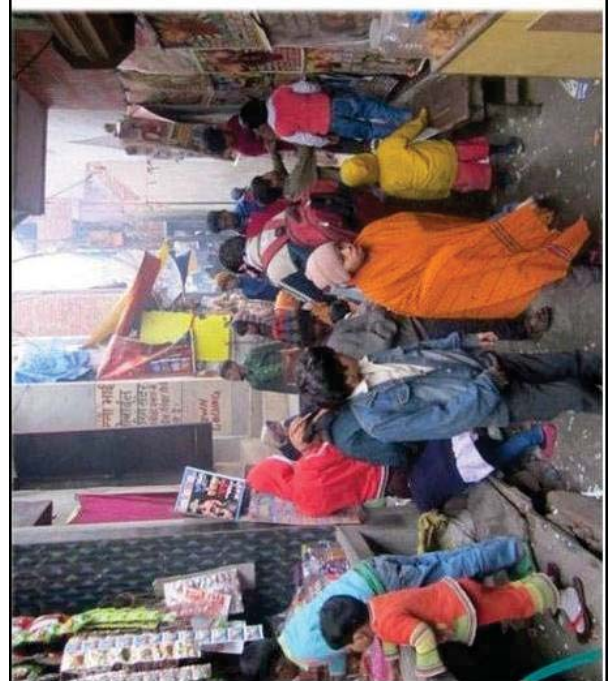


Fig 11.: Kids Playing all alone in both the slums



Fig 12. Proportions of Street

with the fact that streets are narrow and dwellings have small openings directly on the streets which are most frequently (even if uncomfortable) used for the interaction with the people moving on the streets while doing the other important work simultaneously within the dwelling. These streets are the result of people's unavoidable need to depend on each other for the smooth functioning of their daily life. Such streets also depict the kind of togetherness and closeness exists amongst the dwellers. Survey has produced some interesting results as proportions are varied in both the slums (Figure 3). People have registered problems of congestion and discomfort where street width ranged in 01-02 mt. (Simapuri Slum) and have shown the desire for increasing the width of such streets in case of future Redevelopment proposals. On the contrary where streets ranged from 02-04mt., people are comfortable and have no complains about it. The important thing to observe here is that when the distance between the people in the dwelling to the person on the street (Palheda Slum) comes within the range of social distance of 1.2m-3.7m. (Gehl, 2010), interaction becomes more comfortable and frequent while it results into congestive and intrusive conditions if comes into personal zone (0.45m – 1.2 m) as in the case of Simapuri Slum (Refer Figure 3).

VIII. ELEMENTS OF PERSONALIZATION

Along with some similarities amongst the dwellings (mostly in layout) many differences too are observed that provides them with a sense of uniqueness and individuality. Almost Every dweller has done something or the other to connect and easily identify with their personal space. The desire to make their respective dwelling stand out in the crowd can be seen through the response of the survey questionnaire in which one of the questions they are asked is to list most legible spaces one would choose to reach and identify their dwelling with. The response shows not only the repetition of



Fig 13. (Palheda Slum)

some most common spaces in the way to reach the dwelling but also come up with differences and variety in elements they used to identify their dwelling with. It becomes quite an interesting observation because these personalize additions increases the elements of diversity and thus complexity in their environment. They also highlight the dwellers personal attachment and bond with their own spaces (Picture 11 & 12).

IX. ECONOMIC ACTIVITIES

Survey has highlighted the importance of various small scale income generation activities within the settlement. They have a huge impact on the development of that vibrant complexity in the surroundings that people have strong images about. These activities along with providing monetary support



Fig 14. (Seemapuri Slum)

also have various series of advantages attached with them. They offer the effective medium to spend time to different age groups of population within the settlement and also contribute to their survival with minimum expenditure. Survey has revealed that senior people run small shops and find their way to contribute to the household income and keep themselves busy and occupied. The local products produced within the settlement are very often at large consumed within the settlement itself and thereby some people are benefitted by producing them while others are benefitted by consuming them at the cheaper price. Small shops (Refer Picture 13) are setup to sell those products and other similar products of cheaper range. This generates series of activities for people to engage in them and stimulate dynamism in the environment. Survey has shown the presence of small scale industries & shops and dependency or involvement of inhabitants in them. Out of all the families surveyed in both the slums considerable



Fig 18. Frequent Presence of shops along the Street (Seemapuri Slum)

percentage is found to be engaged in such economic activities (Refer Graph Below)

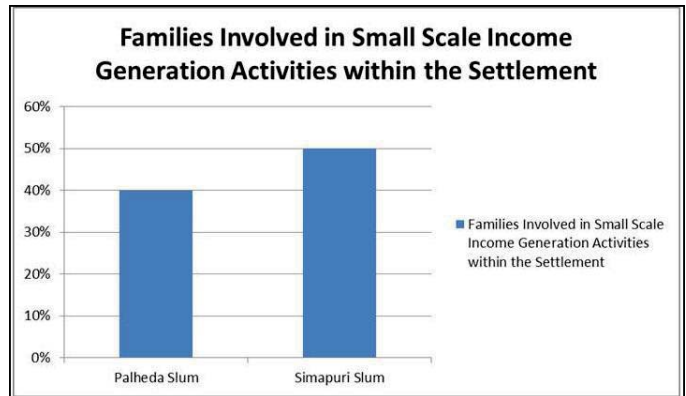


Fig 15.

We have seen that in all the above factors need has been the driving force for their development. These identified factors ultimately lead to that vibrant complexity whose revival is very important for the success of rehabilitation proposals. Since, it is the need that leads to the progress of the identified factors and those factors further forms that natural complexity, therefore, it is this need only which basically leads to the complexity & vitality (Refer Figure 4). It is also behind all the social, cultural and economic factors that becomes the base for the development of that unique feel in the environment which make their people more psychologically connected and emotionally bonded with their surroundings. Moreover, it is this need factor again which is required to be properly grasped and used as the main factor behind the rehabilitation proposals. This could ultimately lead to the development of similar vibrant complexity that rehabilitated people very often found missing and because of that they end up not being satisfied with the authorities efforts meant for their upliftment.

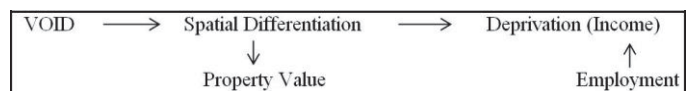


Fig 16.

X. EARLIER REHABILITATION ATTEMPTS

Various problems that are recognized in the earlier efforts can be easily related to the absence of identified factors. The major problems that are observed in the past attempts can be broadly put under social, economic and physical classification. One of the major issues with such projects has always been the money. Shortage of issued funds by the government or poor estimation leading to less no. of dwellings than what was promised (Gurbir Singh, 1995) has earlier been the outcomes. Poverty recycling or selling of the properties by the dwellers because of various reasons such as lack of maintenance & increase in distance from their employment opportunities (Restrepo, 2010) and lack of community living feel has been the cases with more recent attempts. Sometimes proposals are being more politically and profit driven which leads to dissatisfaction amongst the rehabilitated group as they lack the understanding & concern for some very essential elements. Lack of future maintenance and affordability has also come up as a strong reason for the rehabilitated people to again drench

into the life of slums. Another reason that can be identified is directly related to the designing. By observing the architectural drawings one can easily recognize the kind of more formal approach in the design which is apparent through straight streets, vertically dominated units, redundant use of certain elements, etc. This formal & less active way leads to some very critical problems. This directs the promotion of more isolated & individual centred life which is exactly opposite to their earlier & more usual way of living and thus makes them feel as if they are rooted out from their community to some very unfamiliar place. The higher residential block also reduces the large number of social & economic activities and networks upon which the majority of these poor people rely for their subsistence. Famous Danish architect and academician Jan Gehl too criticizes high rise buildings for being responsible in reducing the series of activities as people on the top floors aren't left with many options to venture into city life because of being isolated from the zone of human scale and thereby underscores the importance of Vibrancy and activities at horizontal (more human) level.

All the above problems have also highlighted the failure to revive that dynamic environment which matches the essence of original settlement. The factors earlier identified that helps in the generation of that vibrant complexity in the slums can also be related to the problems found with previous rehabilitation attempts (Refer Figure 5). These factors can be seen as the missing aspects from previous attempts that ultimately lead to the generation of those problems that poses hindrance to the success of such proposals.

XI. CONCLUSION

Paper has revealed the possibility for the existence of certain kind of order that is followed even in the most unplanned and uncontrolled settlements. This order or system can be related with the gradual development of complexity & dynamism in the particular environment. We in the quest for finding the most successful solution for the problems of urban slums need not only to identify that order but also required to employ that in the future rehabilitation projects to revive that sense of dynamism of the originally existed slum environment. Though, onsite redevelopment or up gradation is a better option to regenerate that complexity but many times it is not possible to carry out the same on the slum sites as they are situated at a place that has strong health & environmental hazards such as along railway tracks, along drains, etc. Therefore, it becomes all the more important to identify all the major guiding factors that influences and constitutes that series of experiences and sense of community living that people have strong images about and look for their regeneration in the improved environment. The paper has identified some of those factors that have strong contribution in the development of that vibrant complexity which exist within in such settlements. These factors could also offer the equal opportunities for the successful development to projects irrespective of onsite or off-site constrains on them. Paper has also related these factors with the problems that have been recognized in the earlier rehabilitation schemes to validate that these identified factors have also been missing in those attempts and how they could have been the possible reasons for those attempts being unsuccessful. The paper has opened the door for further research on each identified factor to reveal the order/system that exists and promotes the progress of that particular factor in specific manner.

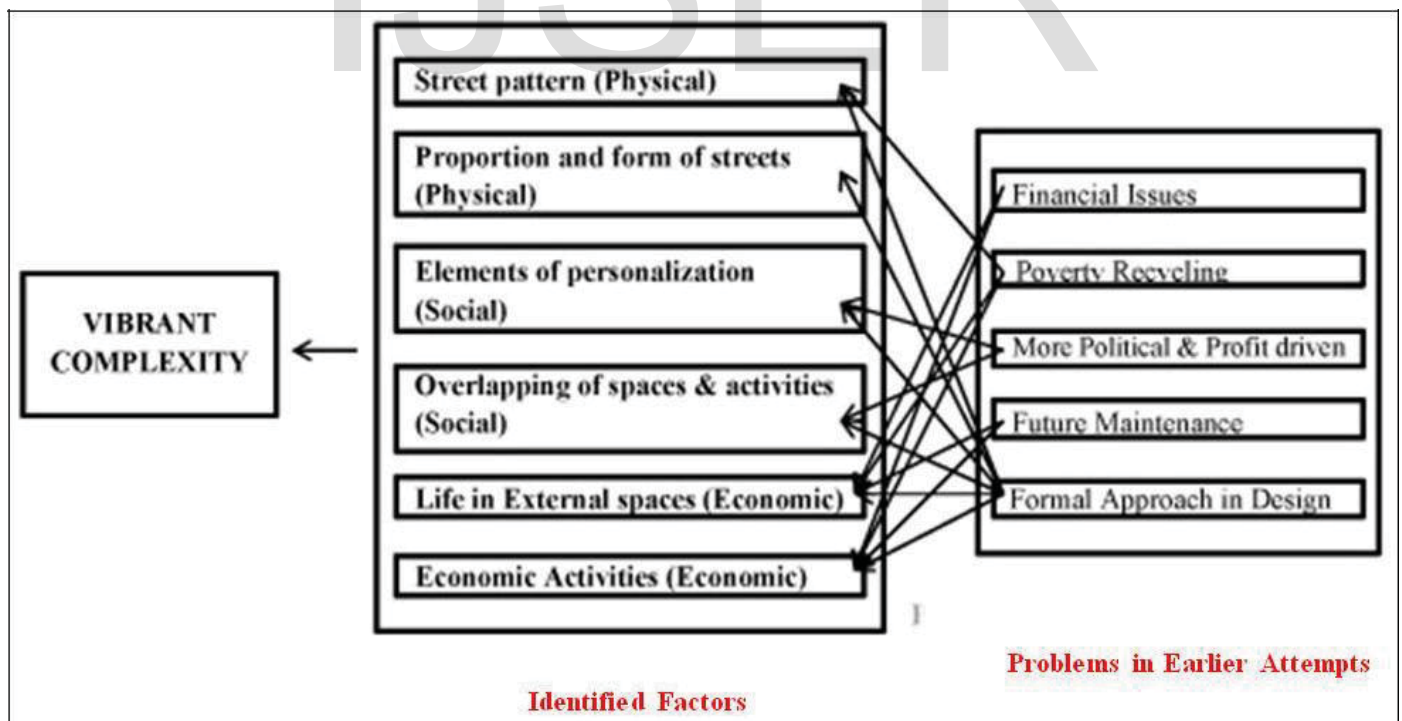


Fig19. Relationship amongst Vibrant Complexity, Identified factors and Earlier Problems

Appendix

Regarding Selection of Slums, Research Methodology & Limitations

As a deliberate attempt 2 following slums of different nature are selected for the survey in order to cover wide range of variations.

- 1) Palheda Slum, Meerut
- 2) Simapuri Slum, Delhi

One slum is consciously selected from the second order metro while the other is selected from the metro city. Though, Meerut is a small city but is an important economic centre with its close proximity to the national capital. It attracts large number of people for business and employment opportunities. Since, it has limitations regarding its infrastructural and other facilities, the problem of slums is slowly but deeply growing and affecting its growth. As per Census of India (2001), Meerut is placed at the 2nd spot on the list of cities with the largest number of slums in India. It was placed next to Mumbai with 44% of its total population residing in slums. With the higher probability to attain the most generalised picture for the kind of slums exist across the country; one Slum is included from here along with the other from National Capital Region.

Also, concern has been given to choose the most distinct slums in terms of their morphology. That is why, one slum has been selected that has grown with the low-cost housing as it is not completely unplanned and has the traces of some organisation & order into its inception phase while the other one represents the more usual situation of uncontrolled, unplanned & haphazard growth of such settlements.

One limitation that can be observed with the selected slums is that both are on the land which is close to the main commutation road and not along any areas that offers serious health and environmental hazards while considerable percentage of the slums in India are on such areas. Though, situation within the slums is quite similar with the majority because of quite unhygienic conditions and lack of some basic

necessities. Secondly, limited families are included in the survey and their response is assumed to represent the whole settlement. Since, entire procedure was quite time consuming and could have taken a lot more time if carried out amongst all the resident families that is why limited families (10-15 No.) were chosen for the survey. Efforts were made to ensure that the selected families broadly cover the typology of all the existing families and the area of entire slum. Survey was carried out and the outcome is studied and analysed carefully together with the Figure Ground Plans, sketches, photographs, etc. Also, information regarding nearby areas was collected & studied to develop the deeper understanding of the situation before synthesizing the data.



Google Earth Image of Palheda Slum, Meerut

Google Earth Image of Simapuri Slum, Delhi

Survey Questionnaire:

General Information

1. Name of the Slum

2. Head of Family

Gender: Male Female

Profession..... Location & Distance.....

Earning Member 1 (Profession) Location & Distance

Earning Member 2 (Profession) Location & Distance

Additional Information:

Distance of Employment Location (In Kilometres) – Fill Applied Code Above

0.0 – 2.5 - A 2.5 – 5.0 - B 5.0 – 10.0 - C Above 10.0 - D

3. Family size (Total No. of family members)

Below 18 yrs. of Age Between 18-50 yrs. of Age Above 50 yrs. of Age

4. No. of Earning Members in a Family

5. Ratio of Earning to Dependent members in a Family

6. Educational Qualification(Refer Table 1 to fill the code)

a. Head of Family

b. Status of Dependents

I. Children (Go to School) Yes..... No

II. Dependent 1

III. Dependent 2

IV. Dependent 3

V. Dependent 4

Additional Information:

7. Religion(Refer Table 2 to fill the Code).....

8. Handicapped person in a Family Yes No

9. Monthly Income of a Family(Refer Table 3 to fill the code)

About Dwelling

1. Area of Dwelling(In Square Metres)

00 – 10 10 – 25 25 – 50 50-100 Above 100

2. Condition of Dwelling

Katcha Pucca Hutment Zopadpatti.....

3. Height of Dwellingæ

G G+1 G+2 Above G+2.....

4. Existence of Attached toilet&bathing facility Yes..... No

5. Attach Proportionate Sketch of Layout Yes..... No

6. Medium of separating internal spaces

Wall Curtain Any Other

Mention if no separation

7. Attach picture of the dwelling and the street they take to reach the dwelling Yes.... No....

(Refer method 1 to understand the procedure)

8. Condition of natural light and ventilation Poor Very Good

9. List, if any space or activities shared with the immediate neighbours

10. Any other important observation that defines hierarchy in spaces or bonding with spaces (e.g. – some times small openings to simply go out and enter without disturbing others in discreet manner, short cuts to their jobs area, etc.)

About Spatial

- 1. Availability of open spaces(Attach Photographs if present)Yes..... No.....
- 2. Distance between dwellings (In Metres)
00 Mention if more
- 3. Width of Street(Refer method 2)
00 – 02 (metres) 02 – 04 (metres) Above 04 metres.....
- 4. Daily routine (Attach photographs with sequence)
Head(in space sequence with respect to slum settlement)
.....
.....

Dependents

- 5. Ratio of Time Spent, inside to outside of dwelling
Head..... Dependents
- 6. List spaces in order (maximum 5 no.) where most time is spent when present outside but within slum settlement(Attach photographs)
1. 2. 3. 4.
.....
5.

About Services

- 1. Availability of drinking waterYes..... No.....
- 2. Source of drinking water
- 3. Availability of electricityYes..... No.....
- 4. Fuel used for cooking(Refer Table 4 for Code)
- 5. Availability of school Yes..... No.....
- 6. Availability of health facility Yes..... No.....
- 7. Place to dispose Garbage (Attach Photograph).....

Questions Regarding Social conditions

- 1. Comfort level with Neighbours(Put Cross at appropriate place)Poor Very Good
- 2. Any shared spaces or activities with neighbours/community
- 3. Presence of Social Gathering spaces (community centres, etc.)Yes..... No.....
- 4. Presence of religious buildings
Temple..... Mosque..... Church.....Any Other.....
(Attach photographs & Sketch showing Streets that leads to various social spaces)

Questions Regarding Future Needs and Preferences

- 1. Present level of satisfaction (L/M/H).....
- 2. Is there a need for RehabilitationYes..... No.....
- 3. List of needs and preferences for rehabilitation.....
.....
.....
.....
- 4. Expected area for a new dwelling(In Square Metres)
00 – 10 10 – 25 25 – 50 50-100 Above 100
.....

Attach List of Major Activities within the settlement(Refer Method 3)Yes..... No.....

Anexxure

Table 1

Regarding Educational Qualification

a) Illiterate	-	00
b) Can Read and Write (Below High School)	-	01
c) High School Pass	-	02
d) Intermediate Pass	-	03
e) Graduate	-	04
f) Post-Graduate	-	05

Table 2

Regarding Religion

a) Hinduism	-	000
b) Islam	-	001
c) Christianity	-	002
d) Sikhism	-	003
e) Buddhism	-	004
f) Jainism	-	005
g) Any Other	-	006

Table 3

Regarding Monthly Income (In Indian Rupees)

a) 0000 - 2500	-	0A
b) 2500 - 5000	-	0B
c) 5000 - 7500	-	0C
d) 7500 - 10000	-	0D
e) 10000 - 15000	-	0E
f) Above 15000	-	0F

Method 1

- Click photographs of the dwelling and the street in which it is situated
- Click photographs of the street (or path) they take to reach to the dwelling (also ask 1-2 members of a family to sketch the single line plan, if possible also sketch yourself the most accurate single line plan along with background areas such as main road it starts from, etc. that helps in putting it into a proper context)
- Now show them the photograph and ask them to pick 5-7 most legible photographs that guide them to reach to the dwelling
- Arrange photographs in a proper sequence and mark their location on the single line plan prepared by you

Method 2

- Make sections and click photographs to record activities on the street
- Observe if any hierarchy of streets exist (click photographs of different types of typical streets and record their Dimensions)

Table 4

Regarding Fuel for Cooking

a) Firewood	-	00A
b) Crop residue	-	00B
c) Cowdung Cake	-	00C
d) Coal Lignite, charcoal	-	00D
e) Kerosene	-	00E
f) LPG	-	00F
g) Electricity	-	00G
h) Biogas	-	00H
i) Any other	-	00I

Method 3

- List major activities performed within the respective slum
- Activities such as daily utility shops, small industry, etc.

Some terms

- | | | |
|---------------------------------|----------------|------------------------|
| 1. Hutment - Collection of huts | 2. Katcha | - Flimsy, poor quality |
| 3. Pucca - Solid | 4. Zopadpattis | - Squatter settlements |

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