

Towards Pro-environmental & Pro-poor Architecture

Understanding the case of Nagpur city

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1 Shelter Situation Analysis

1.1 Basic general data

In India , the development started through five –year plan after freedom in 1951 where the policy towards slums & squatter settlements were considered parasites & need to be removed.

Due to realization of the problems of such an approach there has been a gradual shift to improvement policies with the help of self help and community participation & slum networking . Urbanisation has lead to unprecedented expansion of urban areas , especially in the metropolitan ones. Maharashtra is the first urbanized state of India with 14% of the total urban population residing in it. Total slum population of India is 15% of its total population & out of which 26.6% are residing in Maharashtra.

Nagpur is the second capital of Maharashtra by status, second greenest city in country. The city's location, coupled with growth triggers like the construction of the north-south and east-west corridors, the proposed investments in the multimodal transport hub and the development of the special economic zone promise to stimulate the city's economic growth upto 700%. All major highways & major railway trunk routes connecting India pass through the city.

Rapid urbanization has happened over last few years with industries coming up in & around the city in the fringe areas. This has resulted in population growth by migration of rural masses in search of opportunities in the city. The infrastructure for

the same is not enough hence the housing condition has degraded in the city , particularly for the poor, weaker sections.

Slum settlements have proliferated over past 30 yr. from 1989 to 1992 the slum population has increased at the rate of 23% & today around 40% of Nagpur population is living in slums.

Geography

21-09' North latitude & 79.07' East longitude. Altitude- 307m above mean sea level. It is situated at geographical centre of India on a Western plateau formed in the Western slope of Satpura mountain ranges. Mean annual temperature is 33.0 max. & 23.0 min. but in summers it shoots upto 48 C° & in winters down to 10 C°. Mean annual rainfall is 1200mm with rainy season from mid June to September. In such a contrast climate man needs a sound shelter by any means.

Demography & Health

Nagpur's population (Census of India, 2001) is about 2050,000 with an average density of 95 persons per hectare. The population trends of Nagpur city show a declining growth rate over the decades; it has decreased from 48.3% in 1921-31 to 32.6% in 1991-2001. But, considering the development projects and investments in the pipeline, Nagpur's growth rate may revive and the population may multiply at a faster pace. The core is densely populated & density becomes low towards the periphery. Around 62% of the corporation area is undeveloped. Floating population is 30,000 to 50,000 persons per day.

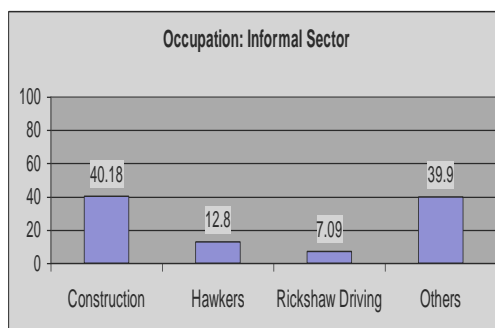
The sex ratio in Nagpur is quite healthy at 93.666 percent of the city's population is under the age of 40; the 10-25 year age group forms the largest proportion of the total population.

Year	Population	Growth rate (Total population)	Slum population	Growth rate (Slum)
1961	6,436,95	+3.6	-----	-----
1971	8,66,076	+3.01	-----	-----
1981	10,50,000	+2.0	4,41,000	-----
1991	16,24,200	+4.4	6,59,509	+4.1
1999			8,00,000	+2.4
2001	20,00,000			

Health services in the region are provided through government & government aided institutions like Zilla Parishads & Municipal Corporation. Several state & central government program covering AIDS, Tuberculosis, Leprosy, Immunisation specifically for pulse polio, family planning etc.

Economy

At city level about 55% of the population are in economically weaker condition or in lower income group. The income of slum dwellers range between Rs. 500- 1000/- per month (1 Rupee = 0.025 US\$) . Most of the household spend maximum share of their income on food.



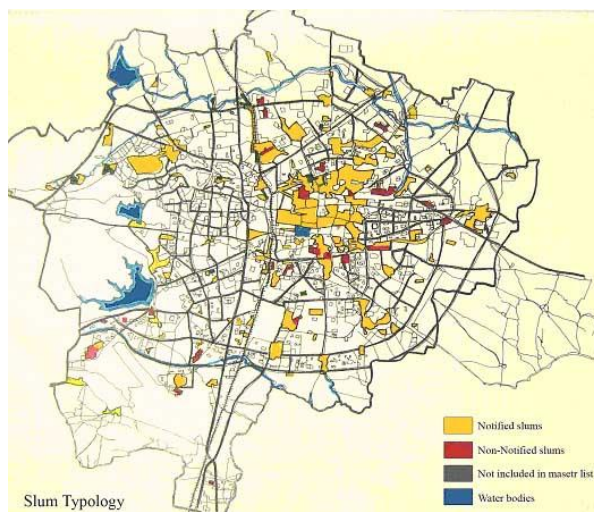
	Total	Male	Female
Total population of slum	8,00,000 (100%)	4,04,880 (50.61%)	3,95,120 (49.39%)
Working	2,72,000 (34%)	19839 (49%)	55,317 (14%)
Non-working	5,28,000 (66%)	2,06,488	3,39,803

1.2 Shelter Related Fact and Figures

Access to Shelter

According to the survey carried out for city plan 1992. Nagpur City accounts a total of 658509 urban poor living in 427 slums & making up a 40% of the total population with a high growth of 22% in the last eight years.. 591185 of them live in authorised urban slums & 67324 live in unauthorized slums.

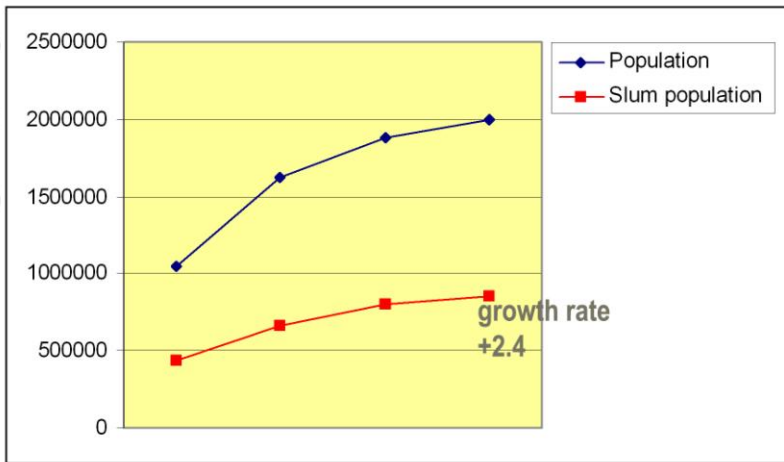
The survey carried out in 2000 by NMC & GTZ for integrated Slum Improvement



Program shows that the population in authorised as well as unauthorised slums is about 800,000 living in 1/3rd city area.

Map II : Location & Typology of slums in Nagpur City (Source: Thesis work , Cept University)

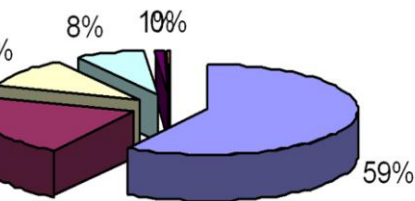
Poor and Pro-environmental Architecture - considering the case of Nagpur City .



density of 195 persons
hectar

Sex Ratio
(Female per 1000 males)

932

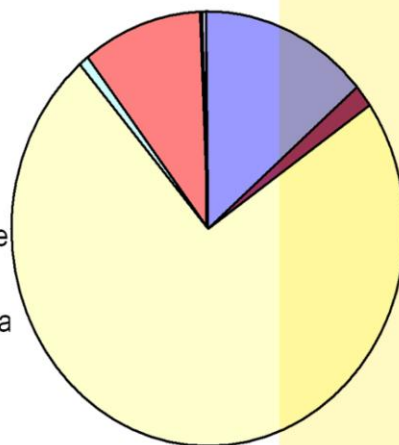


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in other districts of
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- Born in India beyond the State of Maharashtra.
- Born in countries in Asia
- Unclassifiable



- Buddhists
- Christians
- Hindus
- Jains
- Jews
- Muslims
- Sikhs
- Zoroastrians
- Tribals
- Non-Tribals
- Religion not stated

Health

Life Expectancy:

Total : 68.59 years

Male: 66.28 years

Female: 71.17 years

Fertility: 2.81 children /woman

Births: 22.69 births/1,000

Deaths: 6.58 deaths/1,000

Infants

Total: 34.61 deaths/1,000

Male: 39.42 deaths/1,000

Female: 29.23 deaths/1,000

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Immigration

population was below poverty line in 2005. Vulnerability to flooding in low-lying

low ability to pay for basic services, negligence towards informal sector establishments in

g process and lack of consultations with the stakeholders while planning for the urban poor are

issues of these.

Religion

Table – Type of Nagpur City.

	Agencies	No. of Houses	%
Public	NIT	72000	16.48
	MHADA	13572	3.17
Private	Plotted	116125	27.16
	Apartment	53460	12.50
Informal	Slums	135380	31.66
	Unauthorised	36953	8.67

existing stock in

Type of Dwelling	Number	Percentage
Pucca	1,30,263	44.4%
Semi Pucca	1,22,049	41.6%
Kutcha	41,074	14%
Total	2,93,386	100%

Household Size-The average household size according to 1991 census is 5.17 & no of households are 3,14,019. The household size is declining from 5.37 in 1971 to 5.17 in 1991. In slums the households are large with extended families.

Age	No. of Houses	Percentage of total houses
0-20	1,58,927	54.17
20-40	77,308	26.35
40-60	35,412	12.07
60 and above	21,739	7.41
Total	2,93,386	100

Table – Age of existing house structures

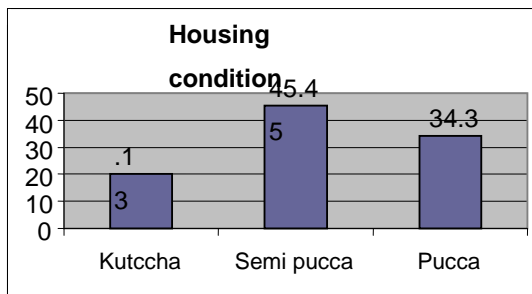
Household tenure-The percentage of buildings between 0-20 years is 54.12% rest 45.83 buildings are above 20 years.

Rented accommodation accounts for about 18% of the population which can increase by 100% in next 10 years due to influx of migrants

Only 14% households live on plots larger than 100 sq.m The smallest plot area is 3 sq.m & highest is 560 sq.m.

Table – Type of construction in Nagpur City.

Type of Dwelling	Percentage
Pucca	22.78%
Semi Pucca	55%
Kutcha	22.22%
Total	100%



Building materials-

Pucca wall: Burnt bricks, stone , cement concrete etc.

Roof : Tiles, galvanised corrugated iron sheets, reinforced brick concrete, reinforced cement concrete, timber

Floor: Cement, brick, stones, finished floor material etc.

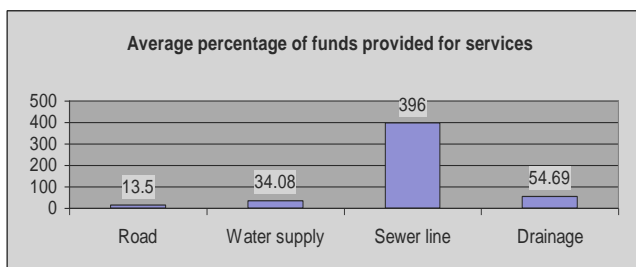
Kuccha Walls & Roof : Un-burnt brick, bamboo, mud, reeds, loosely packed stone, raw wood, plastic sheeting etc.

Floor: Mud , clay, sand, raw wooden planks etc.



Figure III : Slums in core of Nagpur City along Nag River.

Access to and cost of Basic Services/Infrastructure



Electricity- About 12% of the households within the slums are not served electricity. Out of 38% population not provided with metered electricity , 26% manages to get

electricity by illegal means or tapped from neighbours or from the poles. Under the Integrated Road Development Project (IRDP), the City Lighting Improvement

Project (CLIP) was introduced for improving street lighting. The attempt has been highly successful.

Water supply-

NMC sources 470 MLD mainly from surface sources. Currently, it meets demand, but with population growth it may face a deficit situation by 2011. Supply is also dissatisfactory in terms of the number of hours of water supply and water pressure.

Overall, the water quality of piped supply is good but that of ground water sources is unacceptable in terms of hardness, pH and nitrates. The operational expenses for water supply services have been exceeding the revenues each year. Study shows that 62% of slums have been provided with individual water connections, the remaining 32% spend between 2 to 2.5 hours a day in water collection at an average of 8 trips per household.

Sanitation – The current sewerage system covers only 60% of the city and suffers from frequent problems of choking and over-flowing. Pumping and treatment facilities are grossly inadequate; out of 235 MLD, only 100 MLD is collected and treated. Less than 50% of the sewage is collected, which is disposed into the rivers without any treatment. It is observed by YUVA that about 22% people do not have the facility of either community or individual toilets. Community toilets are highly deficit in number.

Drainage - Currently, only 30-35% of the roads have storm water drains. These also carry sewage and hence often get choked and flooded. According to a survey carried out by YUVA out of the surveyed households about 80% of the households are provided with drains, while for 20% of the households there is no provision for either open or closed drains. Children defecate along open drains & get infected.

Roads and public transport-The Integrated Road Development Project (IRDP) revolutionised the roads in the city, which now enjoy an excellent status, in terms of both coverage and quality. Vehicle ownership is quite high; there are 4.6 lakhs registered vehicles and 280 are being added every day. But the corresponding infrastructure in terms of parking facilities is highly inadequate. Also, the road conditions being excellent, the average travel speed is quite high at 25 km. per hour making road safety a cause of concern. Considering the population and spread of the city, the public transportation system is highly inadequate.

Solid waste management- Around 600 metric tons i.e , 75% of the waste is collected through door-to-door collection services under a NGO–NMC partnership initiative & taken to dump yards from where organic & non –organic waste is segregated by waste-pickers . In spite of several awareness campaigns, the segregation of waste at source is not practised. It has been now decided to set up waste to energy- Bio-methanation facility which will recycle 520 tonnes waste per day , thus producing 5.4 mega watts of gross power output. Contracts for road sweeping have also been given out to NGOs and private agencies.

Access to and cost of Education

About 84% of Nagpur’s population is literate as per Census 2001.NMC runs primary schools, which mainly cater to the low-income population. The service levels and infrastructure of these schools is inadequate.Although the constitution provides for free & compulsory education to all children upto age 14, this has remained as a distinct goal. Reasons for the drop have been sited such as household responsibilities, lack of interest, distance of the school premises, lack of availability of education in local language.

1.3 Housing Policies towards slum development & for weaker sections

The attitude towards slum & sub-standard housing has been a changing one with the realization & learning from past experiences giving birth to various policies & programs in different time periods through security of tenure, providing land & housing provision of assistance for self help & creating land banks.

SLUM IMPROVEMENT PROGRAMS:

Slum clearance program: Eradication /demolition and redevelopment /replacement of unfit housing units.NIT took the earliest Clearance measures. Four schemes were developed with 650 plots to settle affected people.

Slum improvement program: Provide “Basic infrastructure facilities” namely water taps, and community facilities, storm water drain, sewer, latrines, paved roads and street lighting.It has been implemented for longer period and coverage is larger, it faces improper implementation and lack of maintenance by NMC and people.

Slum up gradation program: To upgrade/improve the existing civic infrastructure in combination with shelter/home improvement & grant of tenure in land in accordance with the professed government policy through Slum Housing co-

operative societies. Slum societies were formed in a few slums for granting of tenure, and some societies opened bank accounts. The leasehold tenure was not given and further work in this regard was abandoned.

Leasehold tenure to individual squatter household: Provision of leasehold tenure to slum dwellers having their names enrolled in voter's list of 1985 which was extended to 1990. Coverage of the program was poor because of the various conditions for lease, e.g., Name should be enrolled in the voter's list of 1980 or 85 for legislative Assembly, slum should be on Notified government land etc.

Urban basic, services program (UBSP): Strategy of the program is 'convergence', targeting social issues, supported by UNICEF in India. SIP was carried out in 13 slums for which government sanctioned Rs. 650,000. Various programs for mother and child development were like women literacy, rehabilitation of handicapped people and construction of child care centres were conducted.

Slum redevelopment program: The scheme focussed on the redevelopment, construction for censused slum dwellers through owners/ developers/co-operative/ Housing society of slum dwellers/corporation/ MAHADA/ NIT and other public authorities. The implementation of the scheme depended on the initiative and participation of builders and developers who did not show much enthusiasm.

Pay and Use system in Nagpur city: (1996) To construct pay and use toilets for slum dwellers, pavement dwellers and floating population. NMC decided to provide 645 seats of latrines for 1,00,000 people as per requirement: The slum dwellers had been given photo-passes and the villagers using these public toilets were required to pay Rs. 1 as user's charge that was collected by NGO's. The construction program was completed in one year's time but the maintenance has not been taken care of.

Swarna Jayanti Shahari Rozgar Yojana: (1997) :SWSJRY seeks to provide gainful employment through encouraging self-employment ventures or provision of wage employment. 5,000 beneficiaries are the target group .

Improvement program by YUVA: Its central goal is to intervene for social justice. Formation of 162 Self Help Groups (SHGs) comprising of 2350 women members and with the mobilization of deposits to the tune of around 13,00,000, A total of 205 member have taken loan of Rs 15,50,000, from YUVA revolving fund, banks, and other NGOs, of this 90 percent have been recovered so far the loan recovery rate is 100 percent.

In all the above cases , there could have been a possible improvement in maintainence, implementation & quality of the programme by the means of good product design, architectural design & planning to ensure success of the same.

1.4 Actors in Shelter Delivery and their Roles

Government: Over a period of time the Government's role, which was only limited to financing and monitoring of project has changed. Government has now started getting involved with people in the improvement process.

NGO's: There are many NGOs working in the Nagpur but YUVA is the only NGO who is directly involved in the slum improvement The YUVA is working independently and mainly playing role as facilitator between government and CBOs.

People: People started participating in the improvement program with the initiation of Slum Up gradation Program in which Government motivated people in the formulation of self help groups. Institutions involved in the integrated slum development program are NMC with GTZ, NIT, MHADA, CBOs, YUVA .

Private Organisations : These act as consultants for other stakeholders & are rarely a part of the decision making process at the first level. They possess skills & resources required for successful implementation of such projects , but are less often involved due to lack of network with other organisations & lesser monetary benefits .

1.5 Shelter Design

Where Architectural Design & product design has been a neglected subject in poverty alleviaition strategies due to high cost & greater time consumption for implementation of minute details & skills required for the same, these can be achieved by the means of thoughtful ideas & research in the field . Amongst them the aspects often overlooked are:

Shelter Quality: Dwellings should be designed for longer life& attention should be paid to the methods by which the rate of obsolescence can be slowed down.

Safety: To be compatible with nature, we need to eliminate releases of materials that disrupt life. This obviously includes liquid effluent from pipes, smoke from chimneys, and spills onto the ground.

Comfort & Social Inclusion: Universal design should be adopted to give accesibility to all ,acceptable to all cultures & social groups, thus resulting in equality &

flexibility of use, communicating with all sensory abilities, requiring low physical efforts & designed to prevent accidents.

Gender Issues: Participation of women & men equally in processes of planning, policy making & designing is required to achieve fair results.

Sustainable Development: Pollution, deforestation, species loss, and global warming are all by-products of manufacture. We have to create products that have a "total beauty". Using materials that have been grown is also a good thing eg., there are now plastics made from corn as well as the natural materials like wood and paper and leather. All materials flow can be powered by photosynthesis, muscle or renewable energy. This covers products with mounted photovoltaic solar cells, or those hooked up to a mains supply powered by wind, community power generation system for slums, generating power by human movement, wave, biomass, or PV, through to products that are grown or operated by hand. Hence create sustainable design considering use of Cyclic materials, Alternative Energy in Use & Manufacture, use of Substitute Materials, Utility, Durability & Efficiency.

2 Organisation

LOCUS is a firm offering consultancy services in the field of Architecture, Urban & Regional Planning, Housing, Urban Infrastructure, Urban & Landscape Design, Project Management & Interior design. The firm comprises of total strength of 40 with around 30 Architects & other Civil engineers, estimators, project managers & administrative staff. It also has a wide range of consultants for specialized consultancy in services, structural design etc.

The firm has been appointed & has played a nodal role as technical consultant for variety of large scale & technical projects by different Government Agencies Parastatal Organisations, NGO's & a variety of private consultants & technical firms in various capacities.

Firm has high participation in design competition & has won awards for town planning & architecture at national level. The diverse specializations of members in the firm with overall project management, design abilities, expertise in fine detailing & its consultants allow a holistic approach & have left behind multitude of satisfied clients. Firm possesses professionals with strong presentation skills related to Architecture, Multimedia Photography, graphics & visual arts.

Firm conducts weekly seminars & lectures on weekends as incentive to employees & has a seminar room , library & modelling workshop in its own campus.Firm has branches in three cities of India – Bangalore, Nagpur & Hyderabad and also have linkages with other architectural firms at national & international level & is chief architectural consultants for three governments of India.. The firm runs a monthly newsletter for Architecture of its own from year 2006.

3 Shelter Problem

Looking upon failure of Slum Development plans in Nagpur & the whole of India it is realised that poor design & lack of planning contributes majorly to such a condition. MIHAN project is one such example where the project has the ability to power Nagpur's economy in the coming years. Total land area being acquired for MIHAN Project is around 4025 Hectares, of which 1475 hectares will be used for Special Economic Fair compensation & rehabilitation was not offered to the farmers & villagers whose land was acquired. The result is so that these people have started migrating to the core city in search of livelihood. Most of them have started settling near the existing slums in the city. Seeing the possible influx of migrants in the city it is critical to prioritize integrated slums development /upgradation/rehabilitation. & strategize to stop further growth of slums.

The challenge before the city is to ensure that basic services including housing be provided in an equitable fashion to all sections of society not overlooking the quality of the services provided. Now is the time when it should be understood that better design quality should be one of the basic rights for the poor. Also it is very much required to conduct an open competition for design & planning of any further development scheme for these slums & other slum pockets of Nagpur to ensure the best results in terms of Architectural design & planning for the poor.

MIHAN is also an example where public participation through polls was achieved. Lack of knowledge makes them fall prey to the unplanned, unsustainable environment. They are not able to decide over & shape their lives & demand betterment. They are mystified by temporary monetary gains.

Where this is being discussed & described here for Nagpur context only, it widely applies for all developing cities of world. This issue has been neglected by donors, national government & civilians.

Whilst mobilizing architects is seen to be less effective than other strategies of poverty alleviation, themes generated through thoughtful Architecture & Planning have proved to be ideal. The problem here is that attempts through the way of Architecture & design is considered negligible & hence overlooked. Poor architecture & planning & bad product design may lead to disasters in terms of

unhealthy living conditions or inappropriate social environment, further adding to failure of the development plans.

Where Architectural Design & product design has been a neglected subject in poverty alleviation strategies due to high cost & greater time consumption for implementation of minute details & skills required for the same, these can be achieved by the means of thoughtful ideas & research in the field .

4.Proposal for Change & Development

Architecture , more than any other discipline must rest on social & cultural base of its time & place.The practice of architecture not only requires participation in profession but it also requires civic engagement. As a social art , it must be made out of where it exists. It is continually developing profession , now under influence of consumer driven culture becoming part of corporate world .But architects have to be encouraged to practise more honest architecture - which is open & expressing the simple , rather than the grand & ostentatious.

Rather recognizing the links between Architecture , environment & poverty alleviation , it is either ignored or tacked on to development policies & initiatives , when infact it is at the heart of sustainable measures to poverty alleviation. Innovative ideas may very well emerge from the process of adapting such strategies to specific situations , as local conditions always pose unique challenges of their own. Ideas can create impact enough to bring into force major changes.

Architectural firms should be encouraged to assume more responsibility. Architects should be encouraged to participate in the intial decision making position in order to bring about drastic changes .Because architects receive relatively less recognition for social commitment as compared to NGOs , more programs which involve designers in projects that have some public benefit should be planned. It is understood that all this efforts might amount to little in absence of political & financial support for the realization of these projects. Regardless of what one thinks of such a strategy an essential ingredient for its success is surely the presence of professionals & stakeholder's community.

Pro-poor has probably more to do with our nature than any convictions, more with our own private desire than any public virtue. All architects expect & hope their work will serve to the community someday, for the betterment of this world but

there are no clearly defined ways to do this. Therefore it is important to give critical attention to some basic issues that every architect, regardless of time & place, will face. What is more important is using one's talent, intellect & energy in order to gain an appreciation & affection for people. What can be the probable change – will be revealed by itself.

References

Sabir, Ali.

Dimensions of urban poverty.

Charles Abrams

Mans struggle for shelter in an urbanising world.

Jumani

Partnership for poverty alleviation

DBN Murthy

Disaster management.

Anuradha S. Pophali (Student, CEPT University)

Strategies for slum improvement(Thesis Report)

Jawaharlal Nehru National Urban Renewal Mission

Report on Nagpur

Andrew D. Thomas

Housing & Urban Renewal

Government Of India

Selected papers from Training course on Sociological & Economic Aspects of

Housing

www.adb.org

www.ngoindia.com

www.worldbank.org

www.indiatimes.com

Abbreviations:

NMC: Nagpur Municipal Corporation.

GTZ: German Technical Cooperation.

MHADA: Maharashtra Housing and Area Development Authority.

NIT: Nagpur Improvement Trust.

YUVA: Youth for Unity and Voluntary Action.

NGO: Non-Governmental Organization.

CBO: Community Based Organization.

NHs: Neighborhood Groups.

NHCs: Neighborhood Community.

CDSs: Community Development Society.

MIHAN: Multi-modal International Hub Airport at Nagpur

JNNURM: Jawaharlal Nehru National Urban Renewal Mission