Eradication of Slums in Bhopal City

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Abstract

The phenomenon of Urbanization leading to a high population density creates pressure on environmental resources. Air and water pollution levels are higher than the prescribed standards leading to severe deterioration in the health environment of the area. The high percentage of poor (as indicated by the extent of slum population) clearly delineates the population segment that suffers the most due to deteriorating environmental conditions and poor civic amenities. All residents feel the ill effects of air and water pollution and the soil run off. However, the intensity of these effects, ability to cope with these conditions and access to alternatives varies with the income class of citizens and within the income class along the gender lines. It is well known that a large percentage of population in any Indian city belongs to the lowest economic strata i.e. economically weaker section. Majority of this urban poor Population belongs to people who have migrated from the nearby rural areas in search of work, employment. Due to the dwindling land resources and increased population the land holding of any family in the rural population to the nearby city. Most poor immigrants to the city can find access to shelter only by squatting on public or private land. These squatters over the time continue to come and settle on this land thus creating a neighborhood more generally called as slum. But in the format of Housing development, the above vital factors for creating harmonious symbiotic and self-sustainable communities at optimal location are generally ignored and in fact in cases no provision of habitat is made for such population in the planning of housing development. This deficiency in the formal planning leads to development of Slums ad Squatter Settlements to assimilate such population.

Keywords: Topography, Slums & Slum Community, Dwelling Unit Design

I. INTRODUCTION

The strategies are in compliance with the conclusions drawn in the City Development Plan and as per the suggestions of the citizens, elected representatives and the other stakeholders involved in the entire process of preparation of city Development Plan. It has been observing that maximum slums in the city are either along major transport corridors or water bodies or on govt. land.

The strategies for slum improvement are focused on making Bhopal a ‘SLUMLESS CITY’ by 2020. This is proposed to be achieved by providing a sustainable and economical housing options to the slum dwellers under various relocation and rehabilitation program's. The housing strategies for the Urban poor are focused on facilitating the proper land use providing a marketable and legal title to the land owner and providing all infrastructural services for an environmentally sustainable living place.

The year 2020 envisages Bhopal as a “zero slum city” with rehabilitation and relocation of as many as 20000 slum dwelling units in a phased manner.

The objective of formulating this scheme is to prove not just shelter for the Urban poor but also a healthy and enabling urban environment, to help them to come out of their poverty level. In a single line Aim of the project can be stated as - 'to achieve sustainable improvement of the environment with active stakeholder participation and a focus gender and poverty alleviation"

The basic objectives proposed to be achieved through this scheme are as-

- To provide security of tenure
- Sustainable improvement in basic standards of health and Hygiene of people in slums of Bhopal city by provision of basic services like water supply, sanitation etc.
- Sustainable improvement in standards of education and community life and to increase income-earning potential of people in slum's of Bhopal city.
- To integrate the slums into the economic and social networks of the city.
- To make beneficiaries participate not only in financing the project but also in the implementation process and post occupancy management of the project.
- To create Strong, committed and broad-based formal and informal community-bases groups, which participate actively in sustainable development activities established and functioning.

To strengthen local government to ensure that assets created are property maintained and project benefits sustained.
II. Bhopal City

A. Profile:

Bhopal is one of the fastest growing cities in the country. As per census 2001, the population of Bhopal district is 18.37 lakhs out of which 14.30 lakhs live in Bhopal city, in 66 wards, covering a gross areas of 284 sq. km including the lakes and hills. This makes it a low-density city of 50 persons per hectare gross and 63 persons net if the lake areas of 38 sq. km. is deducted from the overall area. Even if the areas steep hill are discounted, the density on habitable land remains low at 80 persons per hectare. Essentially Bhopal is a city of inhabited pockets with open areas and natural barriers in between.

The origins of Bhopal city are a little obscure and not well planned. It is said that Raja Bhoj the famous Parmar king of Dhar, founded Bhopal City in the 11th century at its present site. Another view is that the original city of Bhojpal (eventually corrupted to Bhopal) was first founded on the banks of Kolar River and then subsequently shifted to its present location. He created the Upper Lake by constructing an earthen dam across the Kolans River. The traces of the original town, however, do not remain and only traces can be found.

B. Topography:

Bhopal city nestled in a hilly terrain, which slopes towards north and southeast. Hillocks of different altitudes are situated along the southwest and northwest portion of the city, these hillocks from a continuous belt from Singarcholi up to Vindhyachal range.

The height of Lalghatinear Singarcholiis 65 M, which is maximum in this area. The general ground level is however approximately 460 M, along the southeastern and northeastern portion of the city. The remarkable topography of the city provides and panoramic views of the city and of natural scenic beauty.

The hillocks could be classified in the following three orders depending upon their altitude. This would facilitate to identify the areas suitable for development.

- 1st order - Singarcholi (ManwaBhand), Lalghati, idgah, and Fategarh situated to the North of Upper Lake
- 2nd order - Shamla, Dharampuri and Arera Hills situated south-east of upper Lake.
- 3rd order - M.A.C.T. Char-imliShahpura, Kotra Sultanabad and other hillock adjoining south-east of Upper lake.

The area to the East is comparatively plain without any significant landforms and gradually sloping towards northeast and forming the bowl shape land from. The areas to southeast beyond Shapura hill are gradually sloping towards Misrod.

C. Natural Drainage:

The natural drainage of the city is provided by three main streams, which are of course, joined by small Nallahs and Rivulets. On the northwestern side, the drainage is provided by river Halali and on the southeastern side, it is provided by Kaliyasote River. Both these rivers, drains out in Betwa, Halali near Vidisha and Kaliyasote near Bhopur. On the southwestern side, the drainage is provided by various small nallahs, which drain out in Kolar River, which ultimately joins river narmada.

The drainage water of old city including wastewater of straw products and cotton Mills is carried away by a Nallah, which joins river Halali, which is perennial river. The water of this river is being used for irrigation purpose and very little discharge meets river Betwa near Vidisha. Moreover, the meeting point is on the down streamside of water works for vidisha town.

riverKaliyasote, which provides drainage on the southeastern side, joins Betwa near Bhopur in Raisen District. There is hardly any possibility of utilization of this water on the way for irrigating purposes as passes through a rocky terrain. The water polluting industries located on this side will discharge supply to Vidisha. The Development of Mandideep. Industries growth Centre and its extensions need to be strictly controlled in respect of industries to be permitted in this area to avoid water pollution.

For the purpose of landscape studies, the natural drainage of Bhopal can be classified mainly in three categories viz. Dendritic (tree like branching), Basil and parallel pattern. These are the major landscape indicators revealing the biophysical phenomenon of the area. Broadly speaking the dendritic pattern occurs in the southern part of the city this areas is, therefore, favorable for birds, animals and life. All activities related with this element should be located in this area. The (part) Basil pattern occurs near Chhola and southeastern side of the city near BHEL. The area near chhola has more potential for intensive agriculture owing to availability of fine soil and sub soil water. This is the result of basil drainage pattern. The area near BHEL contains relatively less rich soil. It can, therefore, be used for general agricultural activities or City park. the area suitable for birds, animals and plant life will require further studies in respect of soil, texture, structure, drainage order vegetation etc. to work out detailed operation plan.

Industries proposes to be located on this sides should be non-polluting type or it will have to be ensured that industrial water is fully treated before discharging the same in Kaluyasote, so that it does not cause pollution of Betwa, the source of water supply to Vidisha, a growing town of the Region.

III. Urbanization & Migration

Bhopal city is the most urbanized districts of the state. As per 2001 census, 80.53% of the district population loves in urban areas, predominantly, in the city. Between 1901 to 1921, the urbanization declined as a result of plague outbreaks. The urban
population then rose steadily from its low 30.4% in 1921 to 43.3% in 1951. In 1956, Bhopal was made the state Capital and, in the same decade, the industrial township of BHEL was established. This led to substantial population-increase and by 1961 the urbanization of the district rose to 61.6%. In subsequent decades, rate of urbanization seems to be eventually stabilizing at about 80%.

A. Population Projection:

The population projections for the Bhopal Planning Area up to the year 2011 were made on the basis of different standard statistical procedures. The projected population is presented in Table. It can be noticed that presently the Bhopal planning area is estimated to have 17.61 lakhs population and will be 25.34 lakhs in 2010 and 18.28 in 2020, nearly in next 15 years population of Bhopal will increase by about more than 1.4 times.

B. Density:

Bhopal city is a low-density city of 50 persons per hectare gross and 63 persons net of the lake area of 38sqkm is deducted. Even if the areas of steep hills are discounted, the density on habitable land remains low at 80 persons per hectare. Essentially Bhopal is a city of inhabited pockets with open areas and natural barriers in between.

IV. Social Profile

A. Literacy:

The comparative figure suggests that excluding the population below 7 years of age, Bhopal lacks behind Indore in terms of total literacy. However, the higher education and specialized education scenario is much better in Bhopal city with a large number of academic and research intuition of national repute present in Bhopal. In terms of spoken language nearly 64% of population speaks in Hindi. 20% of population speaks in Urdu, 6% population speaks in various languages such as Sindhi, Punjabi, and Malayalam etc. Bhopal is literacy centre for different language.

<table>
<thead>
<tr>
<th></th>
<th>Persons</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gwalior</td>
<td>67.34</td>
<td>75.24</td>
<td>60.30</td>
</tr>
<tr>
<td>Indore</td>
<td>92.47</td>
<td>87.90</td>
<td>74.36</td>
</tr>
<tr>
<td>Bhopal</td>
<td>70.12</td>
<td>74.36</td>
<td>63.28</td>
</tr>
</tbody>
</table>

Source: Census of India M.P. 2001

<table>
<thead>
<tr>
<th>Caste Structure of the Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caste</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td>SC</td>
</tr>
<tr>
<td>ST</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Source: Census of India

V. Slums & Slum Community

Households are considered poor when the resources that they command are insufficient, to enable them to consume sufficient goods and services for reasonable minimum level of welfare. Informal sector housing is witnessed mostly in the shape of jhuggi settlements involving more than 1.25,000 families some of them occupying strategic locations and critical drainage basin.

A. Urban Poverty:

1) Relative Poverty: Relative Poverty is a poverty measure based on a poor standard of living or a low income relative to the rest of society.

2) Absolute Poverty: Absolute poverty is a level of poverty at which certain minimum standards - for example nutrition, health & shelter cannot be met. The term "Absolute poverty" is perhaps slightly misleading, since there is no "absolute" standard that defined absolute poverty the level of income necessary for these minimum standards is often referred to as the poverty line which various institutions and individuals define oﬀerently.

3) Housing Poverty: Individuals and households who lack safe, secure and healthy living environment with basic infrastructure such as piped water and adequate provision of sewerage sanitation, drainage and removal of household waste.
B. Defining Poverty Line:
The first concept of Poverty line came in 1962. Poverty line is not constant; it varies from country to country and time to time. Goods and Services i.e. consumption, whether purchased, gifts or self-produced, is converted in monetary terms to define the Poverty line. The nutritional intake requirement is considered as constant i.e. 2250 calories/day (average). The average median income in squatters is considered as Rs. 600 / capital / month.

1) Indicators of Poverty:
Besides monetary income, other aspects related to the living conditions, are important to include in defining poverty. There are 7 non-economic parameters to assess poverty:
1) Roof
2) Floor
3) Water
4) Sanitation
5) Education level
6) Type of employment
7) Status of children in life

Weight age & scores are assigned to each of these parameters to assess the level of poverty. Higher the score more is the deprivation. Out of all these parameters 4 are directly related to Housing.

Urban Poor in Bhopal constitutes 25% of the total population out of which 15% are below poverty line as per definitions of poverty line.

C. Definitions of Slums (Census and Slum Act):
1) Slums Definition: 'Slums' have been defined under Section 3 of the Slums Areas (Improvement and Clearance) Act, 1956 as areas where buildings
   - Are in any respect unfit for human habitation.
   - Are by reason of dilapidation, overcrowding, faulty arrangement and design of such buildings, narrowness or faulty arrangement of streets, lack of ventilation, light; sanitation facilities or any combination of these factors which are detrimental to safely, health and morals.
2) Census of India 2001 has adopted the definition of 'Slum' areas as:
   - All areas notified as 'Slum' by State/Local Government and UT Administration under any Act;
   - All areas recognized as 'Slum' by State/Local Government and UT Administration, which have not been formally notified as slum under any Act; A compact area of at least 300 populations or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities.

D. Location of Slums:
A large number of slums are on or close to nullah or riverbank. The slums in the Bhopal are concentrated in the New Bhopal and the Old Bhopal Area. The outgrowths of the city have shown some spontaneous newly formed slums and squatters. The location of the squatters is shown in the Map. The map reveals that 35% of the total slum population in the Bhopal is squatters in the New Bhopal Area where there is maximum govt. land ownership. Around 33% of the slum population lies in the Old Bhopal Area. And remaining 30% of the population is sparsely distributed in the fringes and outgrowths. The study of the locational aspect of the slum settlements reveals that the slums lie in the strategically located and well-developed areas close to the work centres.

E. Slum Population and Growth:
The census figures of slum populations are available only from only 1981, though estimates of slum populations for years 1961 and 1971 could be derived from the supporting documents to the 1975 Bhopal Development Plan. These figures show that upto 1981, the decadal slum growth have been around 110%, just a little higher than the national average. It appears that the adverse migration effects of the events in the city from 1951 to 1961 were over. From 1981 to 1991, the slum population went up by a massive 500%, an increase far larger than in any other city of this scale in the county. In the same decade in 1984, the 'Patta' Act was announced and this, prima facie, appears to be the principal reason for the jump. Closer analysis of the data, however, reveals a different picture. Then again from 1991-2001 the slum population growth rate has stabilized to 92%.

F. Density:
The slums are of low to medium density. In almost every slum, the perimeter of the slum was found to be very dense whereas in the interiors, there were open spaces. The city periphery and old village slums (Gandhinagar, Khanugoan) were of lower density of 50-100 dwellings per hectare. A visual comparison would put inner city slums (e.g. Banganga) and those around industrial areas (Satnami Nagar) at higher densities of 150-200 persons per hectare. There are discrepancies between the numbers of dwellers gauged from the survey and the official lists. This may be due to the nature of definition and identification of the slums and families as per the requirement of each list.

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VI. PROJECT PROPOSAL AND CONCEPT

As envisaged in the City Development Plan it is proposed to rehabilitate the Slum dwellers of Arjun Nagar, Bheem Nagar, Madrasi colony, Rahul Nagar slums to the existing slum site. The slum dwellers of other identified located near the rehabilitation site are also proposed to be rehabilitated at the existing location. these settlements envisage construction of new dwelling units with all in built infrastructural services and social infrastructure. This dwelling units are planned and designed as a cluster of G+3 structures with all required basic infrastructure like Drinking water supply, sewer and storm water network, solid waste disposal, electrification, community center, primary health center etc. Site Location and features.

A. Redevelopment Sites:

The subject sites admeasuring 11.90 hectares approx, longitudinally spreads. The front land will be used for full master plan road section development.

This township meant for rehabilitating Slum dwellers of Arjun Nagar, Bheem Nagar, Madrasi Colony, Rahul Nagar, Slum which Park/Garden, Play Ground, Primary school, Primary health like Community hall. Open spaces, Park/Garden, Play Ground, Primary school, Primary health center, hawkers Zone and Local shops apart from a well developed infrastructure like network of cement concrete 9.0m and 6m wide Roads, sewerage network with sewerage treatment plant, water supply network with over head water tank, external Electrification, Horticulture etc. As per enclosed Layout approx 3528 units will be constructed in the stretch if land admeasuring 11.90 Ha out of which approx 1420 dwelling units will be used to rehabilitate Slum dwellers from existing Slum and test of the units for the rehabilitation of other identified near by slums.

The Summary of Total Houses to be constructed at the proposed Redevelopment and Rehabilitation Sites is as under

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Resettlement Site</th>
<th>Planning Area in ha</th>
<th>No of Dwelling Units to be constructed</th>
<th>Population Benefited</th>
<th>Density DU's/Ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Arjun Nagar</td>
<td>1.258</td>
<td>352</td>
<td>2042</td>
<td>280</td>
</tr>
<tr>
<td>2</td>
<td>Bheem Nagar</td>
<td>3.290</td>
<td>968</td>
<td>5614</td>
<td>294</td>
</tr>
<tr>
<td>3</td>
<td>Madrasi Colony</td>
<td>0.812</td>
<td>180</td>
<td>1044</td>
<td>222</td>
</tr>
<tr>
<td>4</td>
<td>Rahul Nagar</td>
<td>6.548</td>
<td>2028</td>
<td>11762</td>
<td>222</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>11.907</td>
<td>3528</td>
<td>20462</td>
<td>310</td>
</tr>
</tbody>
</table>

VII. PROJECT PROPOSAL

A. Planning of Layout:

The project proposal is a well-planned layout for the Slum population, which will be redeveloped and Rehabilitated at different in-situ Redevelopment schemes. The Layout is incorporated with all necessary facilities as per the Madhya Pradesh Bhumi Vikas Rules 1986. The Redevelopment and Rehabilitation process will attain a good life with all infrastructure facilities and will become an integral part of the city system. The community space, hat bazar and primary health center in the vicinity will create a cohesive development. The Redevelopment and Rehabilitation proposal is considered for the existing number of households in the settlement, which are identified, and the infrastructure is designed for the same.

B. Design Factors:

- The present population of identified settlements will be redeveloped and Rehabilitated at different in-situ schemes Redevelopment schemes.
- The unit designs for the slum dwellers are designed as per the needs of the Slum Dwellers.
- Dwelling units will be provided with all infrastructure facilities like water supply, sewerage, drainage, electrification etc.
- The social infrastructure needs for the proposed settlement has been taken care of .
- Houses would be allotted on "lease hold" basis for thirty years period. The lease can be extended for more years by the BMC before the expiry of lease period.

C. Dwelling Unit Design:

The proposed dwelling units are in clusters of G+3 Blocks. Four dwelling units will be sharing a common staircase and lobby of 16sqm. Group of such dwelling units will be flatted as G+3 structure and such groups are in a row sharing two side’s common wall.

The ground floor of each building block will be partly stilted to provide for parking and other facilities to the slum dwellers. The size of dwelling units is super built up area of 34.18 sqm and built-up area of 40.43 sqm including the share of staircase and lobby. The dwelling units will be provided with two habitable room's one Hall and one Multi purpose room with Cooking Alcove.

The dwelling units will be provided with individual toilets opening in the Multi purpose room. Every dwelling unit will be provided with Tap connection.
**D. Specifications:**

The individual unit is having built up area of 34.18 sq Mt with two rooms Kitchen and attach toilet. The brief specifications of the units are as following:

1. **R.C.C. column with open footing, beam and slab frame structure of C.C. 1:1.5:3 grade with mild and medium tensile reinforcement.**
2. **20 cm thick brick masonry in C.M. 1:6 in sub structure and 10cm thick brickwork in C.M.1:4 in super structure.**
3. **7.5 cm RCC M-20 plinth slab.**
4. **4. Main door and toilet door with angle iron frame and 30mm thick solid core flush door shutter and for toilet M.S. Sheet shutters with Angle Iron Frame.**
5. **Fully gazed steel windows (locally mfg) of standard rolled steel section with guard bar and 3mm thick glass.**
6. **Cement jail in kitchen and toilet ventilators.**
7. **12mm cement plaster in C.M. 1:5 on both inner and outer side.**
8. **6mm cement plasters in C.M. 1:3 on RCC slab inner side.**
9. **20 mm thick Terrazzo tiles flooring.**
10. **color washing on internal surface with lime and cement paint on outer walls.**
11. **Plumbing of B class G.I. pipe and fitting with brass bib cocks 2 points.**
12. **One Orrisa pan.**
13. **PVC pipe for sewer line and roof rainwater disposal.**
14. **Four and half Electrical points.**
15. **Terrace waterproofing.**

A house connection is obviously the most convenient for the householders and per capita water consumption will be more than that of a stand post supply. It is proposed that the municipal water supply system will be provided in the slum areas of the city.

**E. Physical Infrastructure Water Supply:**

A house connection is obviously the most convenient for the householders and per capita water consumption will be more than that of a stand post supply. It is proposed that the municipal water supply system will be provided in the slum areas of the city.

In the design of water networks, the principal trade offs are between the supply pressures, terminal pressures and the pipe diameters. For more balanced pressures across the distribution systems, looped networks are used and advantage of site topography to compensate the frictional losses.

**F. Demand:**

Demand has been calculated as per 135 LPCD Supply and required storage facility has been provided both in over head water tank and underground sump as well.

1) **Specifications**
   - Pipe: Cast Iron Pipes and fittings as per IS 1536 & 1538
   - Valve Chambers: Brick work with C.I. cover
   - O/H Tank: RCC type tank with 16M staging.

**G. Sewerage System:**

The decentralized sewerage network is planned with provision of septic tanks with root zone type treatment plant, in the project. The total treatment capacity of the Septic Tanks provided is based upon 80% of the total Water consumption as per 135 LPCD.

**H. Depth of flow:**

The system has been designed to utilized approximately 80% of the full bore of the pipe at peak flow. The steep slope of the site will help to achieve self-cleaning velocity even at lesser flows.

**I. Velocity:**

The system has been designed for minimum velocity of 0.8m/sec. The silting problem at minimum flow will not occur due to the step slope.

**J. Sizing of Pipes:**

The size and slope is calculated for contributory population. The pipe dia is selected by considering full bore utilization. the pipe sized taken is 250 and 300mm dia. RCC NP2 pipe conform to Indian Standard 458-NP2 class.
K. Minimum Depth of Cover and sewer:
The site is having steep slopes and rock outcrops it is difficult to excavate. The minimum depth of cover thus depends on the depth of the starting manhole and subsequent ground level of the road along the sewer; almost the sewers are planned along the roads.

L. Jointing of pipes:
Shall be jointed as described in I.S. 783, filled in with tarred gasket and mortar (1:2-1) cement : 2 washed coarse sand and caulked by means of proper tools. All joint shall be finished at an angle of 45 to the longitudinal axis of the pipe on both sides of the collar.

1) Specifications
- Pipe :- RCC NP2 pipe conform to Indian Standard 548-NP2 Class
- Chambers:- Brick work with C.I. cover
- Septic Tank:- RCC type tank
- Treatment Plant:- RCC Tank and gravel Filter

M. Storm Water Lines:
At present there is no underground storm drainage in Bhopal in monsoons, the rainwater flows in open drains/nallahhas. The Site Terrain has been taken into consideration while designing the storm water drainage system. The outlet from the site is proposed to connect to city mains and where ever city mails are not available are properly discharged in to nearby flowing natural streams and drains.

N. Roads and Pathways:
The sites are provided with proper Road and Street network maintaining the hierarchy of Roads. Roads vary from 6-12 meter in right of way.

1) Specifications
- Full Section Development with
- RCC Top:- M35-150MM Thick
- Dry Lean Concrete:- M 10-100 MM Thick
- Granular Sub Base:- 100 MM Thick 5-12 mm Coarse aggregate
- Base:- 400MM Thick Hard Murrum

O. Site Electrification and Street Lighting:
Both the overhead and underground system is considered in the planning specially on the major roads of 9.0m width overhead lines are taken and on the 6.0m wide roads keeping the point of safety as well as performance, underground lines are taken. Though the initial capital costs of the underground system are greater, the running and maintenance is cheaper. Underground lines also reduce theft of power compared to overhead lines.

Streetlights are considered at every 50.0m distance at the parapet wall of the building with the help of brackets and pole sodium lamps are taken on the poles at 9.0m wide roads. The total area is divided into different zones as per the load and each zone is having separate sub stations. Only the 9.0m wide main roads are having overhead electrical lines and poles, the rest area is having underground cabling passing through the 150mm dia. RCC pipe.

1) Social Infrastructure
The social infrastructure has been provided with the BDP2005 provisions and Madhya Pradesh Bhumi Vikas Rules 1987.

P. School Building:
Required number of Primary school with 5 no of class room and a toilet is provided, with open playfield. The School Building is not fundable component under BSUP JNNURM School Building will be implemented through convergence with other relevant State or Center sponsored Schemes.

Community center
A 1000 Sq.Ft. area RCC building with toilet store and open ground is provided in all the five zones. As community is Fundable component under BSUP JNNURM it has detailed out and its specifications are given below.

Primary Health Center
Two no of 300 Sq.Ft. RCC building with toilet, resting and OPD is provided. The Primary Health Care Center is not fundable component under BSUP JNNURM. Primary Health Care Center will be implemented through convergence with other relevant State or Center sponsored Schemes.

General specification of Community Center
VIII. PROJECT PHASING AND COST

The total area of the land available for rehabilitating different slum dwellers is approx. 11.907 hect. As per layout enclosed it is proposed to construct Ground+ three structures of row type housed with independent access to the upper floors. In all about 3528 units will be constructed on this existing land.

The cost of construction of single dwelling units comes out to Rs. 1,34,805 as per estimate in closed with. Hence cost of 3528 dwelling unit comes out to Rs. 47.56 Cr.

the total cost of the External development comes out to Rs. 4.95 Cr. and the cost of development of Social amenities comes out to Rs. 0.12Cr as per estimate enclosed with,

Thus Cost of total project is worked out as follows-

Cost of Construction of unit Rs. 47.56Cr.
Cost of External Development Rs. 4.95Cr
Cost of Development of social Amenities Rs. 0.12 Cr
Total cost of Project Rs. 52.63Cr

IX. PROJECT IMPLEMENTATION & SUSTENANCE

The implementation mechanism envisaged for the project attempts to balance democratic accountability with functional efficiency, in a framework of a partnership approach. It is designed to initiate some of the processes of grassroots devolution of power and responsibilities as proposed in the Constitution (74th Amendment) Act 1992, although with short-term circumvention for speedy implementation, until the structures under the 74th Amendment are fully in place and functioning at all scales. The suggestions made in this report are by no means sacrosanct other similar delivery mechanisms may also be considered, provided that the objectives of this project are met within the framework of partnerships, good governance and efficiency.

The success of the project depends partly on the proposed implementation mechanism but even more critically on the larger issues to the governance structures as well as on the overall development of Bhopal city to sustainable demands of the project and even benefit from it.

A. Partnerships and Convergence

The project combines the strengths of all the participating actors with roles varying according to the scales and nature of the tasks. An important aspect of this project is that the slum communities are active partners both in terms of the resources raised as well as in the implementation process. The other principal partners, namely, bilateral development agencies and the private sector providing administrative, technical and management linkages. Micro-credit organisations, NGOs, CBOs and consultants/specialists provide the critical support to the BMC in order to facilitate the project.

B. BMC as Nodal Agency

As an elected local body, Bhopal Municipal Corporation (BMC) is the most appropriate nodal agency, especially as the project is conceived in the framework of the 74th Amendment. At the slum level the project would be implemented through BMC with the active interaction of the slum dwellers. The possibility of delegating implementation to the private sector should also be investigated. At the city level the Corporation will be the principal executing agency and a joint financier with the support of the special bodies, as when required. The other agencies would supplement the Corporation with its community development staff and at the same time enable convergence of other programmes related to the social sectors to the project.

A 15% of the unit cost and the development cost would be met by the dwellers through the ownership rights. In addition a proportion of the net return obtained from the development of the land vacated after the relocation of the Roshanpura slum will be kept for the routine maintenance of the project.

X. FINANCE OF THE OPERATION AND MAINTENANCE

It is expected that the yearly operation and maintenance of the project (excluding building block level O&M) is expected to be Rs 0.30 Cr. per year (6% of Development cost).

Gross amount towards Operation and Maintenance is Rs. 0.34 Cr.

With CBO Rs. 0.21Cr
With BMC Rs. 0.11 Cr
Total Rs. 0.32 Cr

Rs. 0.32 Cr. collections towards operation and maintenance of the Project are more than 6% of the development cost.

Water Charges - Rs 720 per unit per Annum will be collected by BMC as water charges for 135 lpcd supply.

Every Household of urban Poor has to contribute about Rs. 2260 per Annum (Rs 600 to CBO + Rs. 310 to BMC + Rs. 720 towards water charges +Rs 600 on Building Block Maintenance) towards Operation and Maintenance of their assets i.e. every
household need to spend around Rs 188 per month to sustain successfully. The total amount spent by Households on operation and maintenance will not be more than 8% of the Monthly income on Housing and Infrastructure.

A. Post Project Sustenance:

The project addresses the present slum fabric of Bhopal and attempts to assimilate the existing backlog into the city. At the projected rate of growth, around 7,500 new slum families would continue to be added to the city each year. The present ‘project’ approach cannot deal with this future increase and on its implementation; issues of long-term sustenance will emerge. The city and the state governments should anticipate these and gear up to face them. Broadly, the strategy should be to convert this project into a long-term process which deals with the new slum and city growths, city level infrastructure bottlenecks and environmental degradation, resource needs for maintenance and huge capital works and the alternative structures of governance to meet the future challenges.

REFERENCES

[1] 2011 Census Data
[3] Govt. of India under JNNURM Scheme

Websites
[7] Details of Bhopal city by Bhopal Municipal Corporation
[8] Soil Structure of Bhopal City from Geological Department of India
[9] Household Profile - The G.O.I official