



Editorial

This issue contains eight papers. The first is authored by D. S. Meshram on ‘Development of Hill Areas: Emerging Issues and Imperatives’. He shows that basic aim of hill area development is to arrest further damage to the fragile ecosystems and to promote development without destruction. Development Plans of hill areas should attempt to highlight the role of each and every sector of development in bringing economic benefits to a region and in maintaining the vital ecological balance by coordinating various economic and social activities in space. Accordingly, he makes some recommendations to be adopted for different kind of land uses like residential development, public utilities and community facilities commercial development, traffic and transportation, industrial development and terrorism development, etc.; in hill areas.

The second paper titled ‘Managing Pilgrimage and Religious Tourism: A Case Study in Central India’ is authored by Sunita Mujumdar who describes that sacred sites often experience extensive movement of visitors during pilgrimage. A religious event held in urban setting is a complex phenomenon. The nature and scale of impacts including social, cultural or economic, are governed by location whether rural or urban. Annual pilgrimage of Deekshabhoomi during Dhammachakra Pravartan Din (DPD), a popular pilgrimage centre of Buddhism at Nagpur city in central India, is the largest congregation of the Buddhists pilgrims in the world. Local bodies as well as many voluntary organizations are involved in making the event successful. The present study conducted in year 2010 attempts to assess its impact on urban infrastructure and management in Nagpur city.

The third paper on ‘Walkability of Transit-Oriented Development: Evaluating the Pedestrian situation of Faridabad Metro Stations’ is written by Satpal. This paper shows that walkability is one of the most important elements in of transportation under the concept of transit-oriented development (TOD). TOD represents an integrated approach to transportation and land use planning. The key component to TOD rests on pedestrian access between mass rapid transit stop and surrounding areas. The success of any TOD rests on the capacity of pedestrians to access land uses in close proximity to transit station. The purpose of this study is to measure walkability on the basis of connectivity in given stations. Catchment analysis using pedestrian catchments (or ped-sheds) can then be used to ascertain development and population potential of a TOD, and this can be checked against the transit capacity of the transit corridor and its stations.

Ruchita Gupta has authored the fourth paper on the theme ‘Night Shelters in Delhi - An Overview’, which underlines that Delhi has an estimated population of 1.5 lakh, which is without access to shelter, water, and sanitation. This constitutes roughly 1 percent of the city’s total population. Of the 1.5 lakh homeless 7,000 people are women constituting close to 5 percent of the total homeless in the city. This number continues to swell with increasing migrant population who comes to Delhi in search of jobs and dreams of better life from the neighboring states. Night shelters are places designed to provide shelter to the homeless for a night with the provision of toilet and drinking water facility. To meet the minimum shelter needs of the homeless in urban areas, a centrally sponsored ‘Nigh Shelter Scheme for Footpath Dwellers’ was initiated by the Ministry of Urban Development and Employment during the Seventh Five Year Plan (1985-90). This paper shows that Delhi Government never availed the benefits of this central scheme and relied on its own funds for the construction and management of night shelters in the city.

Madhur Kukreja and Pulkit Singal’s paper on ‘Generational Shift in Construction using Inter-Locking Bricks in a PPP based Model’ notes that more than 20 percent of India’s urban



population lives in slums. Mega cities such as Mumbai have more than half of its population living in slums or other unauthorized tenements. Unless suitable technologies and policies aimed at providing affordable housing are adopted, the situation might even get worse. Using inter-locking bricks can bring radical improvements in the construction parameters-time, cost, ease of construction and flexibility in design. This technology, coupled with vernacular building materials, has the potential to bring down costs of construction. This way of producing affordable housing could be modeled on the lines of Public Private Partnership (PPP) whereby government provides land by regularizing the existing settlements and other municipal services, while private players, through CSR initiatives, bear costs of construction materials and logistics, making the whole model environmentally sustainable.

Rajalaxmi Das in her paper on 'Political Participation of Women in Politics: Decreasing Trends in Odisha' contends that politics in Odisha is male dominated. Our tradition, culture and scriptures all pay respect to women and regard women as goddesses. But in practice women have had to be content with a subservient role within the house for centuries. There has been discrimination against women right from the birth. This is still part of our society and majority of Indian women's life itself has been a long struggle both within and outside the family. Therefore, women have not found adequate representation in the Lok Sabha and the same is the case in State Assemblies. The idea of women's participation naturally assumes greater importance in a democratic system. It is argued that participation is the principal means by which consent is granted or withdrawn in a democracy and the rulers are made to account.

The seventh paper titled 'Urban Complexities and its Implications on Planning Education' is written by Pratap Raval. He asks how does contemporary planning addresses dynamic process. It is being increasingly recognized that current urban planning education systems lack an effective future oriented approach that would enable them to anticipate in future transformations, effectively prepare to tackle city complexities. This paper discuss importance of innovation in education and new possibilities for learning that are independent of time and place, expanded possibilities for experiments using tailor made models, and additional demands on graduates have led to new study programs and educational concepts. He notes that there is a strong need for a major shift in planning education for interdisciplinary approach, the way of thinking and acting about the future of cities, and a shift from the traditional mind-set to a more imaginative, innovative and inclusive approach.

The last paper on 'Critical Issues and Option for Management of Water in Indian Urban Sector' is written by Prakash Chandra Tamrakar and Abir Bandyopadhyay. The paper describes the rapid rise in urban population, heavy demand on land for commercial and residential development, etc.; has resulted in filling of surface water bodies by earth or other filling materials and then buildings take place on such places. Natural water bodies and drainage channels are being encroached upon and diverted for other purposes. Heavy dependence on ground water has led to over exploitation. Rainfall is the main source of groundwater recharge, and water table normally rises in response to rainfall in particular period. This relation has been changing because of reduction in the number of water bodies and paved and impervious surface covered ground water recharge zone. This has led to rapid decline of ground water level and drying up of shallow wells and bore wells in many parts of urban and rural India. This paper attempts to highlight some critical issues on water resource management and provides options by discussing various tools and techniques available to meet urban water demand.


Ashok Kumar
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Development of Hill Areas: Emerging Issues and Imperatives

Prof. D. S. Meshram, Ph.D.

Abstract

Basic aim of hill area development should be to arrest further damage to the fragile ecosystems and to promote development without destruction. Development Plans of hill areas should attempt to highlight the role of each and every sector of development in bringing economic benefits to the region and in maintaining the vital ecological balance by coordinating various economic and social activities in space. The author accordingly, recommends paradigms to be adopted for different kind of land uses like - residential, public utilities and community facilities commercial, traffic and transportation, industrial and tourism, etc.

1. INTRODUCTION

Hill areas have generally remained poorly developed even though having rich stock of natural resources like forests, hydel power, minerals, etc. Ever increasing pressure of humans and their activities further aggravated the situation considerably by damaging the ecology and environment of the hill areas. Excessive exploitation of natural resources and implementation of ill-conceived projects have been threatening the eco-system of hill areas, creating discernible destructive impact in the plains by way of flash floods, siltation of water bodies, loss of soils and crops, damage to human habitat, etc., which will ultimately be causing irreversible loss of life and property.

However, there is no denying the fact that hill regions have their own problems and potentials because of their peculiar settings and conditions but some of the common problems of hill regions are indiscriminate felling of trees, excessive exploitation of natural resources, soil erosion, shifting of cultivations, faulty agricultural practices, low extent of cropped land, fragmented and small holdings, heavy pressure on agricultural and urban lands, least diversified economy mainly rural and agrarian, large extent of uncultivated wastelands, inadequate irrigation facilitates, scarcity of buildable land, emergence of linear urban corridors, inaccessibility of certain areas, uneven development of urban system, deficiency of infrastructure and lack of preventive measures for ecological damage caused due to the mineral and mining operations. The hill areas are basically low density zones, which are experiencing rapid increase in

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population, the general scenario is that poverty thrives amidst resource plenty hill areas.

2. ECO-SYSTEM OF HILL AREAS

Human interference in hill areas disturbs eco-system which causes soil erosion and changes in micro environment of hills because soil eroded on hill slopes chokes river channels, resulting in floods in plains and deltas. Therefore, it is imperative to maintain balance in the ecosystem of hilly terrain to ensure that side effects of human activities in hill areas do not percolate to downstream.

Heavy influx of population from plains, besides floating population, is the major source of threat to hill eco-systems. To meet demand of this ever increasing population, construction activities get boost in urban areas, irreversibly affecting the ecology of hills. In addition encroachments and unauthorized developments increase vehicular traffic, disposal of human waste in low lying areas and solid waste disposal play major role in disturbing hill environments.

High altitude, dense forest coverage and low population density are basic ingredients in balancing hill ecosystem. High attitude bring in cooler climate than plains. Flora and fauna changes with change in seasons. Vegetation on hill side terrain not only enhances the beauty of landscape by providing greenery but also is responsible for preserving the environment. At lower elevations of mountains abundant rainfall and temperature provides dense vegetative cover and forests. But this natural ecosystem very rarely exists in mountains due to interference of man. Tribal population which inhabit such inhospitable terrains invade forests for shifting cultivation and non-tribal clear forests for harvest woods, cultivate agriculture, fruits and plantation of crops.

There has been heavy demand for forest based industries for raw materials such as wood, gums, etc. In hill areas degradation of forest areas is generally caused due to ill effects of rapid growth of population; increasing tourist influx; unplanned development of human settlements; construction of roads and canals; quarries and mines; so as to meet the increased demand of forest based industry. But let us not forget that forests stabilize climatic conditions and maintains balance in hydrological cycle which is essential for the existence of human and animal beings.

Quarrying and mining is mostly carried out by open cast for removal of mineral resources such as limestone, dolomite, magnetite, rock phosphate, building stones i.e. slates, marble, granite, quartzite, etc., which destroys valuable top soil, while debris from quarries are dumped in adjacent hill slopes block natural drainage, ultimately creating considerable threat to hill ecosystem.



3. HILL AREA DEVELOPMENT IN VOGUE

No special approach has been followed for planning and development of hill areas despite the fact that about one fourth of states in India fall in the category of hill states in addition to other states having also hill areas to some extent. However, there is no denying the fact that considerable awareness has been created about the deterioration of environmental quality and conditions in hilly regions since the Stockholm Conference on Human Environment held in 1972. However, remedial measures are not keeping pace coping up with the alarming situation. Hill areas have been receiving the attention of concerned state governments from time to time and specific programs on hill area development were initiated, but they generally lack in physical and spatial dimensions because most of the schemes are either activity specific or target group oriented and are sectoral in nature. In order to have a tangible effect of these programs and schemes in achieving desired objectives of ecological balance of hill areas there is a need to follow integrated approach by synergizing all such programs and schemes both horizontally and vertically.

It is well known fact that industrial development in hill areas is not adequate besides whatever industrial development has taken place has been confined to only few isolated pockets leading to wide spatial imbalances in the hill regions. Tourism although emerging as important economic activity has also not been developed in an integrated manner, at least in hill areas. Forest is being used as the major fuel wood because of non-availability of alternative source of energy, causing larger-scale destruction of forests. A sound development of forest would not only help in eco - restoration but would also provide industrial timber. Hill slopes are specifically suitable for large scale plantation and horticulture crops. With good scope of fodder production, besides dairy farming has considerable scope for development in these regions. Sustainable exploitation of minerals would help in setting up mineral resource base industries, thereby leading to diversification of economy. Therefore, it is pertinent to adopt integrated approaches in order to have sustainable development of hill regions because hill areas have vast potentials for development. By adopting integrated approaches and proper land development measures, there is wide scope of bringing more areas under agriculture and forests.

4. COMMITTEE ON DEVELOPMENT OF SMALL TOWNS IN HILLS AND BORDER AREAS

Committee on “Development of Small Towns in Hill and Border Areas” setup by Government of India observed that small towns in hills and border areas suffer from a triple handicap. Firstly, they are not only backward in themselves



but happen to be located in relatively backward regions. Secondly, in most of the states, hilly terrain forms large proportion of land with less population and are less better off. Thirdly backwardness is writ large in almost every aspect of their socio - economic conditions. Therefore, the problem of hill and border towns cannot be treated in isolation. Any attempt to develop hill towns without a similar corresponding effort in their hinterlands and wider regions will be but artificial and they will not be able to sustain the momentum given to them. Their development has therefore to be an integral part of a larger program for the overall development of hill regions and problem has to be tackled with utmost inter-departmental collaboration, coordination and understanding.

The Committee further noted that programs of economic development will definitely increase urbanization, but would also reduce pressure of population on the primary sector. Secondly, it may increase the number of people residing in urban areas as the existing towns in hill areas are too small to be viable units and because of their smallness they are not able to provide sufficient employment and maintain the economy of a town at satisfactory level nor are they able to provide the basic services and amenities which cannot be economical unless they cater to the larger population than the one existing in them. Hill areas with natural endowments have large economic potential but need to be utilized in rational and sustainable manner by taking into consideration their sensitive and fragile eco - systems and their peculiar character and accordingly, focusing on their problems, development strategies. The strategies followed in plains may not be suitable for hill areas. Therefore, the Committee propagated integrated development of hill areas. The major recommendations made by the Committee are:

- There is a need to formulate Economic Development Plans and Programs for hill and border areas as distinct Regional Plans which are bold in conception with urgency in terms of priority and more liberal in matters of financial and technical assistance from central and state governments. In the Regional Plans there should be a proper integration of economic and physical (land use) planning.
- Preparation of Master Plans in advance for anticipated urbanization in hill towns is recommended, that is to say the Committee followed the proactive approach in planning. Advance preparation for anticipated urbanization must begin with the preparation of master plans. For preparation of master plans, centrally sponsored schemes of giving 100 percent grant should be extended to small hill towns.



- In a master plan the outlying region with which it has intimate socio - economic interactions needs to be taken into consideration for addressing problems of water supply, sewerage and drainage, power, roads, community facilities like school, hospitals and dispensaries, parks and play grounds and social and cultural amenities like libraries, clubs and community centers, etc., on priority.
- For urban areas, soil control measures like provision of proper drainage facilities, planning of trees and construction of walls should be considered to prevent landslides.
- Economic development of any area is inconceivable without a good network of transport and communications. It is in this particular respect that hill areas and their towns happen to be in a most disadvantageous position. It is therefore, imperative that development of transport and communication is undertaken in an integrated manner on a priority basis.
- There is need not only to improve existing roads and to widen one way roads into two way roads but also to establish new road links wherever required.
- Without adequate and economical power supply, mechanization; modernization, and industrialization are inconceivable, so also economic development. In the matter of power generation and consumption, hill areas and their small towns remain far behind the country. At the same time mountainous and hilly areas contain many sites where generation of hydro-electric power is possible which needs to be explored.
- Existing conditions in regard to water supply, sewerage, drainage and other services and civic amenities in hill towns are woefully deficient. Methods of sewage and waste disposal are extremely crude and clumsy. Active steps to meet these deficiencies are immediately called for.
- For improving health facilities in hill towns, existing standards of hospital and health care facilities should be raised.
- With a view to improving housing conditions, terms and conditions of slum improvement schemes of Government of India should be liberalized to cover small hill towns.
- Hill towns should be given priority in the matter of grant of loans under various housing schemes.
- One of the urgent requirements in hill and border towns is to convert dry latrines into flush latrines wherever water borne sewerage systems exist.
- Hill towns offer immense potential for tourism and trade. A tourist traffic promotion program on a big scale may be launched for the benefit of hill towns. Tourist facilities should not only be concentrated in larger hill towns



but also extended in an increased measure to smaller towns so that they may have a chance to grow quickly.

- Scenic beauty and salubrious climate of hill towns are among their prized assets which must be turned into good account. This can be done by development of tourist trade for which hill towns offer immense potential. A tourist traffic promotion program should focus on attracting a large number of visitors; making the flow of tourists regular, and holding the tourists for longer periods.
- Forests are one of the precious resources of hill regions. Since area under forests in most of hill areas is much below the desirable standard of 60 percent under forests in hills, there is need to undertake an ambitious afforestation program in hill areas.
- A major plan of industrial policy for hill towns should be to develop local industries to meet local demand and also to establish those industries whose products can bear the burden of high transportation costs in outlying markets.
- Small scale and cottage industries hold good promise in hill and border towns.
- It is also desirable that instead of tackling the problem in bits, the problem is tackled through well-coordinated, phased and integrated manner.

5. EMERGING ISSUES IN HILL AREA DEVELOPMENT

Existing towns in hills are affected more severely due to population growth because of migration from nearby small towns and villages in addition to natural growth. To meet their demand, existing facilities services and infrastructure gets overburdened which is not planned for such a heavy load of population and may result into collapse of whole system. Excessive population which is accommodated in existing towns in fact settles in forests and low lying areas causing deforestation, adversely affecting the ecology of the region, adding more and more infrastructure for catering to the ever increasing tourist population, hotels and restaurants, and summer apartments, cottages and resorts further resulting in enormous increase in vehicular traffic requiring widening of roads at the cost of green areas and lake fronts adversely affecting the fragile eco - systems of hill areas. Besides, emerging trend of promotion of tourism for generating more revenue will further put demand on more infrastructures requiring more and more development and construction activities. This vicious cycle will not only damage the eco - system of hills but will lead to mass scale destruction leading to floods endangering the life and property. Therefore, tourism promotion should not be done at the cost of destroying ecological balance of hill areas. However, to energize the economy of hill areas, development of tourist infrastructure such as construction of new roads, hotels, cottages and allied activities needs



to be encouraged. As the buildable land is limited in hill settlements, it will be desirable that growth of tourism is made in such a manner that it contributes to growth and development of the region but not at the cost of destroying hill regions and eco - system of hill areas.

As hill areas has very low capacity to sustain large number of inhabitants, therefore, a network of settlements should be planned clearly defining their capacity and then strategy should be worked out to make investment in such a manner that a dispersed settlement scenario emerges. However, for creating such a network proactive approach needs to be followed by adopting minimum damage and disturbance strategy so as to preserve eco - sensitive areas. Land use structure in hilly areas is different from towns and settlements in plain areas. Therefore, there is a need to evolve planning standards suited for the requirements of hill areas because these norms and standards have a bearing on the social, economic and physical fabric of towns and also regions. The approach that “one size fits all” is not suitable for hill areas. Therefore, care should be taken to evolve norms and standards of hill areas taking into consideration their ecological, socio - cultural and physical necessities and requirements of the people residing in hill areas. Besides, norms and standards should not be very rigid but flexible and adaptable.

Land use planning should be based on land capacity. Very steep slopes should be forested while moderate slopes should be put to a mix of horticulture, fodder, plants, etc., while valleys and plain flat lands in hills should be brought under cultivation for food crops. All these aspects should be supported by proper land development programs such as terracing, contour bunding, trenching of hill slopes, construction of check dams, etc. Encroachments on forest lands should be checked and removed and forests should be enriched by planning of denuded and sparsely forested zones.

To strengthen the economic base of hill settlements, it is imperative to attract industries in addition to tourism for overall development of regions but at the same time it is also essential to ensure that location of such industries do not create environmental and ecological problems. Specialized and eco - friendly industries which do not consume large areas, do not use chemicals, do not emit foul pollutants, and are not resource intensive should be encouraged in hill areas in the zones which are earmarked for such activities taking into consideration orientation aspects. Industries producing value added products but are labour intensive, and are high-tech and environmental friendly such as electronic industries should be encouraged along with agro - based and cottage industries. However, it is pertinent to note that any attempt to promote unchecked industrialization in hill area would be disastrous.



Hills and mountains have vast scope for water resource development by planning proper irrigation schemes, which will help in augmenting ground water table by recharge which in turn will develop vegetative cover. In addition there are also enormous potential for generating electricity from perennial rivers, which needs to be harnessed for producing hydro-electric energy which could be sold to other states and agencies which will boost economy of towns and regions and ultimately that of the concerned state. But encroaching on the course of rivers and changing the course of rivers should be avoided to ensure that disasters are not repeated.

Uncontrolled mining and setting up of limestone based cement plants and stone-crushers in hill states have created enormous problems and incalculable damage to eco - system and also to vital flora and fauna.

An emerging phenomenon of people from plains purchasing land in hill areas for speculative purposes has also resulted in land being diverted from agriculture to non-agriculture uses. Exploitation of land for commercial purposes like hotels, restaurants, resorts, shopping, etc.; is also creating enormous pressure on enhancing land values due to absence of proper checks and controls. Sullage from these areas is being disposed of in natural water bodies resulting in pollution, besides solid waste management from these activities is also assuming alarming proportion. In addition ribbon development in an unauthorized and uncontrolled manner along roads is creating traffic bottlenecks and chocking of traffic. These unabated construction activities, and unauthorized construction is resulting in landslides and disasters. All these issues call for promoting sustainable development which is commensurate with carrying capacity of these areas without disturbing eco - systems.

6. IMPERATIVES IN HILL AREA DEVELOPMENT

As stated in earlier sections of this paper, it is imperative to follow integrated development approach for the overall development of hill areas. However, this approach requires coordinated action in all aspects of development at all levels. Taking into consideration the broad goals at regional level, development programs for the specific areas at lower level should be worked out to have a top down linking and similarly programs at lower level should be adjusted in such a way that they synergize well with the objectives and resources provided in higher level plans to have bottom up linkages. Horizontally, all programs need to be coordinated in a detailed development plan as outlined in Urban Development Plan Formulation and Implementation (UDPFI) Guidelines. Reliable, timely, accurate, complete and useful data and information on land use, natural resources, socio - economic activities



and other parameters of development are the prerequisites for integrated development approach.

Percentage of flat land for development in hilly areas is quite less, which entails slopes for construction activities. Generally slopes can be divided into three parts i.e. 0 to 15 percent buildable; 15 to 30 percent - sparsely buildable but usable; above 30 percent are not useful even for recreational purpose; However, generally 40 to 50 percent land is buildable and available for construction purposes. Out of which 15 to 20 percent is being taken up by approach roads and communication routes. Rest 30 percent is available for construction of buildings for various uses. Thus, land available for physical development is limited to 30 to 40 percent of the area within 0 to 30 percent slope, which is again having natural constraints like earthquakes, scarcity of potable water, etc. Therefore, possibility of clearly delineating areas which are highly inaccessible, and could be made accessible, and are easily accessible could be explored. On the basis of which all hilly states can be divided into regions which require protection and preservation, and could be used for development to a limited extent and areas for good human habitation could be created.

The following issues merit consideration among others for the development of hill areas for different land uses in hill areas.

6.1 General

- While developing human settlements in both urban and rural hill areas, it should be seen that land is optimally utilized and not over utilized; due to limited availability of flat and buildable land.
- High rise concept could be adopted but not at the cost of destroying ecology and environment of hill areas.
- Preserving salubrious environments of hill areas should be given priority which will help in maintaining ecological balance.
- All developments including tourist and commercial activities should be within the carrying capacity of an area and excessive exploitation of tourist potential of hill areas should be discouraged.
- Lake and water bodies should be protected both visually and biologically by taking measures like:
 - Prohibiting the construction within 200 m around the lake;
 - Locating recreational spaces at a distance of 300 m from water bodies to safeguard them from pollution due to dumping of solid waste;



- Construction of hotels and resorts to be allowed only 1.5 km away from lakes; and
- Uses having less built up area to be encouraged by restricting plot coverage and height.
- Deep cutting, extensive excavations and filling of low lying areas should be avoided.
- Historic features and areas of heritage importance should be conserved and incorporated in a plan as conservation areas.
- Natural vegetation should be prominent than built structures.
- Cutting of trees should be discouraged at the same time existing trees and green cover should be protected and certain incentives may be provided to encourage such activities.
- Activities encouraging induced growth of population should be discouraged.
- Non-conventional energy sources like solar and wind mills, etc.; should be promoted because the main sources of power supply are through micro hydel projects the production of which varies with level of water in a water channel.
- Everyday activities like recreation, marketing, health, education are carried out by walk. Therefore, such activities need to be placed at a minimum walkable distance to save wastage of time and energy.
- Use of solar and wind energy should be explored so as to meet the deficiency of power requirements. Proper grouping of various land uses and buildings would be useful in this direction.
- Provision should be made in building bye laws for trekking, mountaineering and other types of adventure tourism and recreational activities, etc.

6.2 Residential Development

- To follow the gridiron pattern in neighborhood planning in hill areas is difficult. Therefore, it would be appropriate to plan residential development along communication routes by evolving proper zoning regulations and building bye laws.
- Due to undulated terrain of hilly areas, the mode of conveyance is four wheelers or by foot. Cycles and two wheelers are not very successful and there is not much scope to widen roads to accommodate them. Therefore, home and work place relationship should be taken into consideration and efforts should be made to reduce distance between these two places.



- For sitting, orientation and spacing of buildings adequate sunshine, day light and ventilation should be ensured. Buildings facing sunny side would receive the maximum sunlight during the day.
- Building design should be compact taking into consideration cold climate.
- Building should be designed following the existing slope without damaging the surrounding environment.
- Locating buildings on low lying areas should be avoided because it blocks drainage system.
- Contour should be followed while locating buildings and also for the alignment of roads.

6.3 Public Utilities and Community Facilities

- Water conservation and harvesting need to be adopted because major constraints faced in hilly areas are basically water supply because rivers, lakes, springs, natural falls and streams get dried up during the summer season.
- Due to excessive cold in some hilly areas, water supply pipelines get frozen during winter season. Therefore, adequate measures should be taken to ensure continuous water supply.
- Due to undulated terrain it becomes difficult to maintain a sewerage system, therefore, septic tanks should be encouraged.
- As rainfall compared to plain areas is more, efficient and proper drainage system is required to drain off rain water. In addition drainage facilities should be planned to protect slopes from erosion and filling of natural drainage should be strictly prohibited.
- Solid wastes and liquid waste management should be done by following the policy of “polluter to pay”.
- For solid waste collection and disposal it would be advisable to segregate bio - gradable and non - bio gradable wastes by providing containers at appropriate locations and then be treated.
- Due to non-availability of adequate area for land fill sites, latest technologies for disposal should be adopted.

6.4 Commercial Development

- Location of convenient shops should be encouraged in residential areas of hills due to sparse development.
- Shopping facilities should be located in areas which are easily approachable.
- Norms and standards followed in plain areas for commercial places should be lowered down to suit to local conditions.



- Parking places, especially near commercial centres should be provided to avoid choking of roads.
- Mushroom growth of commercial activities especially along major roads in the absence of lack of parallel corridors within a city to divert traffic during tourist season, needs to be addressed in proper perspective by identifying suitable locations and redeveloping them, properly.

6.5 Traffic and Transportation

- Mobility in hill areas is generally provided with all-weather roads or with fair-weather roads with or without cross drainage works. Heavy monsoon in hill areas for longer period of the year causes landslides on roads, under cutting of roads, and heavy discharge in rivers, which makes rivers un-crossable and roads unusable. Therefore, clearance of slips and other restoration activities are necessary to make road traffic movement smooth so that roads remain open for traffic and provide accessibility to places throughout the year.
- Basically water is the enemy of roads, which calls for providing proper drainage system to drain rain water effectively so as to continue the traffic movement.
- Landslides and road blockages affect the movement on roads, therefore, proper retaining walls and breast walls should be provided to safeguard roads from landslides and land erosion, etc.
- Hill areas are generally handicapped due to the absence of proper and adequate roads for passengers and goods. Therefore, linkages through rail, water, air, rope ways wherever feasible should be provided.
- Mixing of local and through traffic on national highways should be avoided.
- Poor road geometric and poor design of intersections should be improved.
- Proper terminal facilities for local buses and goods vehicles should be provided.
- Traffic which is not destined for a settlement concerned should be diverted from outskirts of settlements.
- At proper locations terminal facilities for passengers and goods should be provided.

6.6 Industrial Development

- To boost the economy of a town it is essential to attract industries by providing separate industrial zones for the industries which do not pollute the environment and generate hazardous wastes.
- For carrying raw materials required for feeding such industries and carrying finished products, location of industrial zones should be such that local traffic



is not affected. Care should be taken to avoid the mixing of local traffic which is not destined for settlement concerned.

- Industrial zones should be separated from residential areas by providing buffer zones to ensure that they do not affect their environments due to generation of sound, pollution of air and release of hazardous wastes, etc.
- IT industries should be encouraged in industrial zones of hill areas. Agriculture based industries and cottage industries should also be encouraged.
- For loading and unloading of industrial products, adequate and proper space should be provided in industrial zones.

6.7 Tourism Development

To strengthen the economy of hill towns and regions, it is imperative to develop tourism in a sustainable manner by taking the following measures:

- Identify tourism destinations and prepare tourists circuits by linking places of adventure tourism, religious tourism, nature tourism, etc.;
- All such activities should be properly linked together;
- Develop tourist infrastructure like hotels, markets, exhibition grounds, camping places, museums, at the appropriate locations;
- Provide proper linkages by roads and rail and other modes of mobility to all places of tourist interest and connect them with tourist infrastructure.
- While developing tourism, care should be taken to ensure that tourism promotion is not made at the cost of damaging the ecology and culture of hill areas and should be within the limitations of the bearing capacities of hill towns.

7. CONCLUSIONS

Basic aim of hill area development should be to arrest further damage to the fragile ecosystems and to promote development without destruction. Development plans of hill areas should attempt to highlight the role of each and every sector of development in bringing economic benefits to the region and in maintaining the vital ecological balance by coordinating various economic and social activities in space. There is an intimate and inseparable relationship between environment and development and the objective of sustainable development cannot be achieved by ignoring environmental aspects. In order to have development without destruction, all socio - economic and physical activities need to be planned within an ecological framework.



Managing Pilgrimage and Religious Tourism: A Case Study in Central India

Sunita Mujumdar

Abstract

Sacred sites often experience the extensive movement of visitors during pilgrimage or on any religious event. A religious event held in urban setting is a complex phenomenon. The nature and scale of the impacts be it social, cultural or economic of these events is governed by its location whether rural or urban. The annual pilgrimage of Deekshabhoomi during Dhammachakra Pravartan Din (DPD), a popular pilgrimage centre of Buddhism at Nagpur city in central India, is the largest congregation of the Buddhist pilgrims in the world. The local bodies as well as many voluntary organizations are involved in making the event successful. The present study conducted in year 2010 attempts to assess its impact on urban infrastructure and management within Nagpur city.

1. INTRODUCTION

There are several challenges in urban areas in today's India. Indian cities and towns have become overcrowded and are growing haphazardly. Exploding population is the major cause of this population growth. Population of a town at any given instant is basically composed of two groups: one is residing population and other is floating population. However, it has been observed that the latter is many times neglected in major policy decisions. With faster and more convenient modes of transportation being easily available, there is always a considerable increase in the number of floating population. Floating population has their major contribution to a city's economy in certain cities like market towns, tourist destination towns, border towns, etc. History has shown that religious pilgrimage and tourism has been the goal of majority of seasonal floating population. Although pilgrimage is primarily and individually motivated journey informed by personal faith, it is also a mass movement when viewed in terms of magnitude and frequency of such travel (Stoddard, 1997). The impact of a religious event on city depends upon the scale of the event and also upon the size of the city in which it is held. According to Angeles Rubio Gil (2008) Religious tourism as a special interest event has a highly complex impact on local communities. During their stay in the destination tourists use the existing infrastructure of the city. Consequently, this floating population brings change both positive and negative in the host community's quality of life. Positive changes include the growth in the economy and negative impacts are mishaps like a stampede and overburden on infrastructure. Thus, for the smooth conduct of such events, their governance and management are significant issues.

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2. RELIGIOUS TOURISM MANAGEMENT ACROSS THE WORLD

A lot of research work has been done so far in the field of religious pilgrimage and tourism. The scholarly discussion on discerning similarities and differences between the two forms of travel, pilgrimage and tourism, has dominated the literature (Cohen, 1992; Graburn, 2001; Smith, 1992; Smith and Brent, 2001). The other major quantum of literature on religious tourism is primarily anthropological and discusses its religious, social, cultural, and economical dimensions. Research work to study the socio - economic impacts of the pilgrimage of dew, Spain (lady of dew), which gathers about million pilgrims for 3 days is of similar case (Angeles Rubio Gil and Javier de Esteban Curiel, 2008). Some discussion on the environment in sacred sites has only recently begun to surface (Shackley, 2001; Sofield, 2001; Tanner and Mitchell, 2002). The environmental issues are more significant in the Indian context, where more than 100 million Indians embark on pilgrimages each year (Times of India, 2001). Substantial literature on the Religious tourism (pilgrimage) in north India for *ArdhaKumbh* as well as *Maha Kumbh* and the pilgrimage of Tirupati and Sabrimala of south India discusses the environmental impacts on these sacred sites and the natural resources around them (Kulshrestha and Sharma, 2006; Shinde, 2007, Delage, 2005).

Apart from previously discussed issues, management of religious event is an important issue. It is really challenging to manage a huge crowd of lakh of people; gathering in proportionately small area unless the crowd itself cooperates. Managerial concerns arising out of managing high density tourist / pilgrim situations and other high density tourist/pilgrim sites have been the focus of few tourism studies (Pearce, 1989; Wanhill, 1980). It is beneficial to identify some of the world's largest religious gatherings and understand their managerial aspects to have a better picture of religious tourism management across the world. However, the management and planning of few pilgrimage centers around the world are noteworthy / remarkable. A comprehensive review of management as well as highlighting the significance of the Pilgrimage of Hajj at Mecca is provided by Zafar U. Ahmad (1992). People flow management through the use of sensors, cameras is practiced in city of Turin, Italy when over 2 million pilgrims arrive during Ostension of holy shroud. This event lasts for 40 days. Such systems provide not only the number of persons accessing an area but also their speed and direction.

From a planner's point of view, planning and management are two important issues for the convenience of both tourists and city dwellers. With regular increase in the number of tourists every year, it becomes an important matter of concern for planning authorities to assess whether space used for such mammoth events is appropriate or not both location wise and area wise. Every event has two parties involved - the provider and the user. Before every religious event, the provider i.e. event organizers either religious institutions or urban local bodies along with the help of many NGOs make many efforts every year for the proper

arrangement of the devotees. Still there is a possibility that some lacunas are observed. So it is required to identify gaps existing between provider and user to address issues of impact on the city's infrastructure. This paper contributes towards projecting a methodology to study and develop an understanding in the field of religious tourism management. However, there is a scope of further refinement in the methodology.

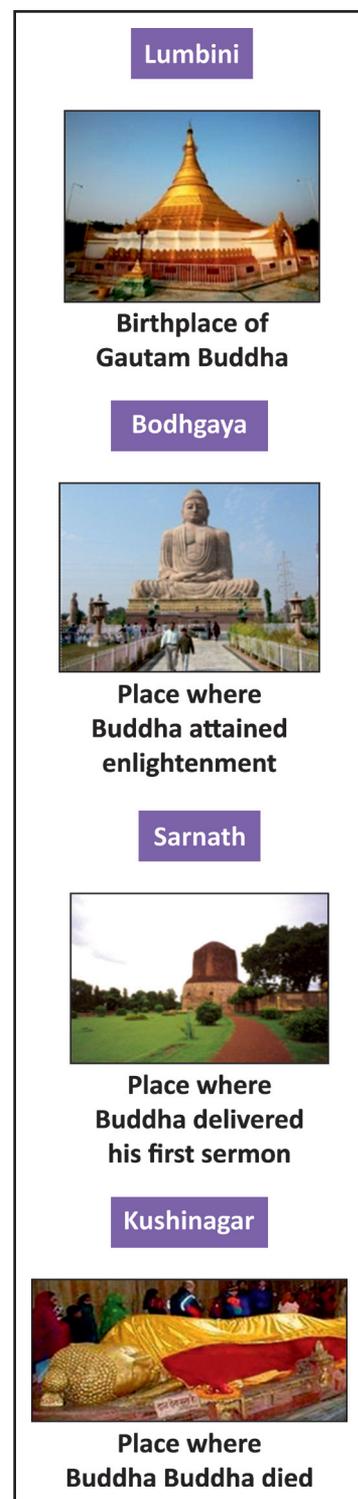
3. BUDDHIST RELIGIOUS TOURISM IN INDIA

Being world's fourth largest religion, Buddhism was founded in India by Gautama Buddha in the 6th century B. C. The four holy sites refer to those destinations that have been witnessed to some important event in the life of Lord Buddha (Fig. 1). They are intrinsically connected to the life of Gautam Buddha and have utmost significance in the development of Buddhism. Lord Buddha, himself, referred to these sites as most worthy of pilgrimage. Fig 1 describes the significance of four holy sites in Buddha's life. Other important and holy sites of Buddhism in India are Rajgir, Nalanda, Sravasti and Vaishali, which are listed in Buddhism tourism circuits by United Nations ESCAP Tourism review No. 24.

However, there are two other famous and most visited pilgrim centers of Buddhism in India and both of these are located in Maharashtra, namely Mumbai and Nagpur. A Dalit Buddhist movement, which was initiated by Dr. Ambedkar, is the major cause behind the special significance of these places as Buddhist pilgrimage centers. Thousands of Buddhist devotees gather in Mumbai on the death anniversary of Dr. Babasaheb Ambedkar on six December every year. This Memorial Day is called "Mahaparinirvan Din" when a large number of his followers visit Chaitya Bhoomi- Shivaji Park, Dadar in Mumbai. Mumbai being a metropolitan city has been already an overcrowded city, so most of the Buddhist pilgrims prefer Nagpur over Mumbai for pilgrimage visit. Dhamma Chakra Pravartan Day (DCPD) is celebrated every year on Vijayadashmi (Dashhera) in Nagpur at *Deekshabhoomi* to mark the historic moment when Dr. Babasaheb Ambedkar along with his followers embraced Buddhism in 1956.

Nagpur, the study area, is the third largest city in Maharashtra (Fig. 2) after Mumbai and Pune and is also very famous for "Zero Milestone". The Centre is regarded as the pilgrimage center of Buddhism in India. Nagpur is the winter capital of the state of Maharashtra. With a population of 24,05,421 (2011), Nagpur

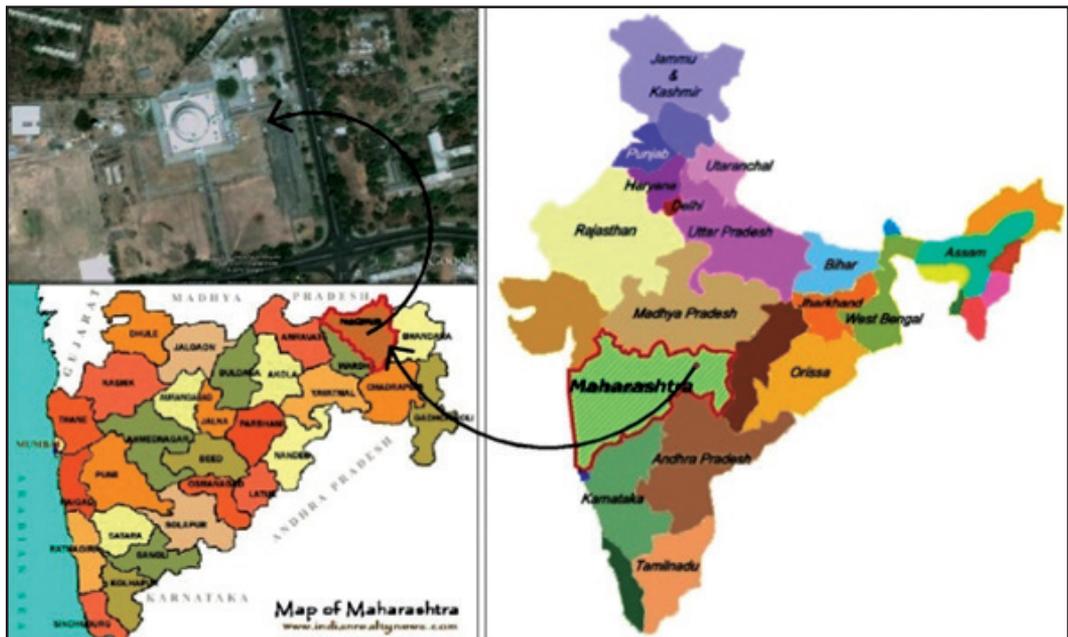
Fig. 1: Four Holy Sites of Buddhism in World



Metropolitan Area is the 13th largest urban conglomeration in India. It has also recently been ranked as the cleanest city and the second greenest city of India after Bangalore. In addition to this, Nagpur is also a major commercial and political center of the Vidarbha Region of Maharashtra.

People of Nagpur celebrate many religious events and festivals. Festivals of all religions, i.e. Hinduism, Islam, Buddhism and Christianity are celebrated with a lot of enthusiasm. Many of these festivals are enjoyed socially in groups. These festivals involve gatherings of large number of people at one place. These festivals also are extended by long processions and extravagant carnivals through selected roads of the city. Some of these festivals are Ram Navami- Shobha Yatra, Janmashtami-dahiHandi, Poole, marbat, Ganapati festival, Durga Pooja, RavanDahan on Dashhera etc. During the festival of Marbat in Nagpur, people construct statues of evil spirits and then take out a huge rally. These rallies can be found in every part of Nagpur district. After the statues are taken through all the areas, they are burnt in the presence of the people of the respective neighborhood. This burning ritual commemorates the end of the harmful forces. Among Muslim community, Urs of Tajjudin Baba is the major event being celebrated in Nagpur at Tajbagh. People from various parts of India and Islamic countries throug the Chotta Tajbagh during this event. The event lasts for one week extended by a month long fair in the surrounding playground. Among Buddhist festivals or events, Dharmachakra Pravartan Din is the significant occasion which brings together large number of Buddhist devotees at one place.

Fig. 2: Location of Study Area



Many of the above events are celebrated through large processions and rallies. These events cause a significant burden on the city's infrastructure and lead to traffic congestion in many areas. Nagpur is not known as pilgrim city, however the pilgrim influx of various religious events here is quite large. Nagpur is well connected with all places in local, regional and state level. As the mode of transport to reach Nagpur being more easier, population and pilgrims in the city are growing, whereas the infrastructural system is falling short and becoming worse.

4. DEEKSHABHOOMI: BUDDHIST PILGRIMAGE IN NAGPUR

The sacred site of Deekshabhoomi is situated in Nagpur; the largest city in central India. The Ambedkar followers in India, especially from Maharashtra, celebrate this festival as Ashok Vijaya Dashmi. It is believed that the Mauryan Emperor Asoka converted to Buddhism on this auspicious day. Later in 1956 the architect of the Indian Constitution, Dr. Ambedkar also converted to Buddhism on this day at Deekshabhoomi, Nagpur. In 1956 Ashok Vijaya Dashmi fell on October 14. Since then thousands of tourists visit Deekshabhoomi on Vijaya Dashmi as well as on 14th October each year. People from all over the country who follow Baba Saheb Ambedkar and Buddhism gather at Deekshabhoomi. Deekshabhoomi is the main tourist attraction in the month of October as tourists from Japan, Thailand, China and other countries visit Deekshabhoomi to pay their homage. Deeksha in Sanskrit means acceptance of religion and Bhumi means Land, the meaning of Deekshabhoomi is "The land where people accept another religion". Deekshabhoomi is not only famous for its architectural (Table 1) beauty and

Fig. 3: Large Gatering of Devotees at Deekshabhoomi





Table 1: Number of Pilgrims in Various Occasions at Deekshabhoomi

Occasion	Influx of Pilgrims
Daily	2000
Ambedkar Jayanti (April)	1 lakh
Buddha Pournima (May)	3 to 4 thousand
Dharmachakra Pravartan Din (October)	5 To 8 Lakhs

historical importance, but is also a major tourist attraction in the state of Maharashtra. The Government Indian also started a train in between Gaya and Nagpur as these are the main Buddhism Pilgrim centers in India and named the train as Deekshabhoomi express.

Religious event of Dhamma Chakra Pravartan Din (DCPD) on Dashhera every year at Deekshabhoomi gathers millions of visitors since 2-3 days in the city (Fig. 3). In 1950s, Dr. Bhimrao Ramji Ambedkar selected Nagpur for his conversion ceremony, as he explained in his speech on that occasion, because Nagpur was the homeland of *Nag* people who embraced Buddhism and supported it with great efforts in its early period (21). It is a sacred monument of Buddhism at the place where Babasaheb Ambedkar converted to Buddhism along with his about 380,000⁽²²⁾ followers on October 14, 1956. About 6.25 lakh Buddhist pilgrims visited Deekshabhoomi in 2009. Absence of the sufficient arrangements and basic services for the pilgrims causes inconvenience both to the visitors and the local residents. The grandness of this event and its overlap with the Dussehra festival, increases the severity of the issues associated with organization and management. There is a need to study the impact of this religious event and the possible lacunas in the existing planning process for the event. Thus, it provides as an interesting case study for articulating the functioning of religious events in an urban setting interaction.

This paper attempts to present a description of both qualitative and quantitative impacts by assessing the pilgrimage of the Deekshabhoomi. The broad aspects of the impact assessment under the domain of planning and management are transportation and infrastructure. However, the present study has been limited only to the impacts related to infrastructure comprising of accommodation and utility services for pilgrims during DPD. To understand the burden on the infrastructure facilities during the event (DPD - 2010) as well as to find out its impacts, data collection from both Primary and secondary sources have been done. Primary sources include:

- Participative observation of the major event day (DPD) October 2010; and
- Indepth interviews which were carried out in October 2010;
 - Survey of Pilgrims on the major event day (DPD - 2010) and two succeeding days of event i.e. during Dashhera;
 - A survey of Pilgrims on the minor event day, i.e. on Ambedkar Jayanti; and
 - Opinion surveys of surrounding local residents.



The semi-structured, in depth interviews were conducted for a sample size of 150 pilgrims. The interviews were either one to one or in focus groups of 3-5 pilgrims. To get an overall picture about the influx of pilgrims in Deekshabhoomi throughout the year, survey was also conducted on Ambedkar Jayanti i.e. 14th April for a sample size of 175. Opinion surveys of residents of the surrounding area of Deekshabhoomi were also conducted after the (DPD2010) event for a sample size of 50 households. Secondary Sources include Nagpur Municipal Corporation, Dr. Babasaheb Ambedkar Smarak Samiti, Deekshabhoomi, Nagpur Railway station, Bus station/MSRTC, Maharashtra tourism development corporation (MTDC) and Other Ngo's working for various arrangements during this event.

5. MAJOR FINDINGS

5.1 Institutions involved in Religious Event Management

Nagpur Municipal Corporation is the major authority which is responsible for making arrangements for this special religious event at the city level. Various departments working under NMC like Health Department, etc.; provides necessary facilities for the visitors of the event. Many sister organizations of city government and infrastructure like Police department, Nagpur Improvement Trust, Public Works Department, Water Works Department, Electricity Department, Traffic department, etc. also work in coordination with NMC to provide the required infrastructure for the event.

Dragon Palace, an unique Buddhist temple is located in Kamptee, a satellite township, 18 km away from Nagpur. The temple with its characteristic architecture has received an international award for the best concrete structure. Maharashtra State Road Transport Corporation provides special bus service from Deekshabhoomi to the dragon Palace for the pilgrims during the event for three days i.e. event day, one day prior to event and one day after the event. From Table 2, number of buses run per day come to 45 which shows that after every 20 minutes, buses were run to the Dragon Palace, Kamptee Road. Load factor above 100 percent shows that buses were occupied by more visitors as compared to the ideal capacity. As per the information collected from MSRTC officials, the special buses for DPD event are run after cancellation of regular bus trips to nearby destinations like Yavatmal, Bhandara, etc.

Table 2: Details of Special Bus Service during DPD 2010 for Pilgrims of Deekshabhoomi by MSRTC

Name of the trip	Event Days 2010	No. of vehicles utilized	No. of trips	No. of passengers carried	Load Factor	Traffic Receipts	Expected Earning
Deekshabhoomi to Dragon Palace	16 th oct. to 18 th oct.	136	784	24667	104.43%	623173	5,96,746/-



All the NMC and Zilla Parishad schools were instructed to make the arrangements for accommodation of pilgrims during the event for 3 days only in case of rains. A proper one month day-wise schedule of works for making arrangements of the event is prepared by NMC every year. As per Annual NMC Budget Report, finance for the arrangements for this DPD event is made for Rs. 25 lakh reserved for all the developmental works in Deekshabhoomi premises. Apart from local government bodies, lot of Non - Government Organizations and political parties also take part in making some basic arrangements for the pilgrims of this event. But in spite of all of the above preparations, lot of lacunas are observed in the overall needs and functioning of this mega event because all arrangements and preparations are provided in bits and pieces and lack a comprehensive approach. Hoardings of map showing the location of various arrangements provided for visitors of this special DPD event in the city are provided at all important locations of the city namely: Main Railway Station, Ajani Railway Station, S.T. Bus station, Madhya Pradesh Bus station, Indora square, Rahate Colony, Wardha Road, Reserve Bank Square, NMC control room, Matakacheri, ITI premises and Patwardhan Ground

5.2 Survey Findings for DPD Event, 2010

Visitors travel in a group basis to attend the DPD event (in brotherhoods or family and friend groups). Devotees of all the age groups i.e. from small kids to old aged people visit Deekshabhoomi.

Trend of Pilgrims / magnitude of visitors' influx: There are three occasions when Deekshabhoomi receives huge influx of pilgrims namely Ambedkar Jayanti, Buddha Pournima and Dhammachakra Pravartan Din (DPD). A regular influx of visitors is clearly visible throughout the year; On an average, there are about 60,000 pilgrims every month; more than 2,000 every day. (Table 4). Magnitude of pilgrims' flow in Deekshabhoomi is highest on the Dhammachakra Pravartan Din (DPD) which coincides with the Dashhera festival of Hindu religion. A constant increase in the number of pilgrims coming to Deekshabhoomi is clearly seen in Figure 16. The total numbers of pilgrims in Deekshabhoomi for the DPD event have doubled from about 3,80,000 in 1956 to 8 million in 2006. The data collected for the past 10 years for visitors in Deekshabhoomi for the DPD event (Fig. 5) and clearly shows a distinct pattern of visitation.

The data shows a continuous growth in the population of Nagpur city (Fig. 6) as well as in the floating population for the DPD event at Deekshabhoomi. Data collected from the secondary sources show that the congregation of nearly 6-8 lakh of pilgrim population occurs in Deekshabhoomi on the actual day of DPD event.



Fig. 4: Decadewise Trend of Pilgrims in Deekshabhoomi during Dashhera

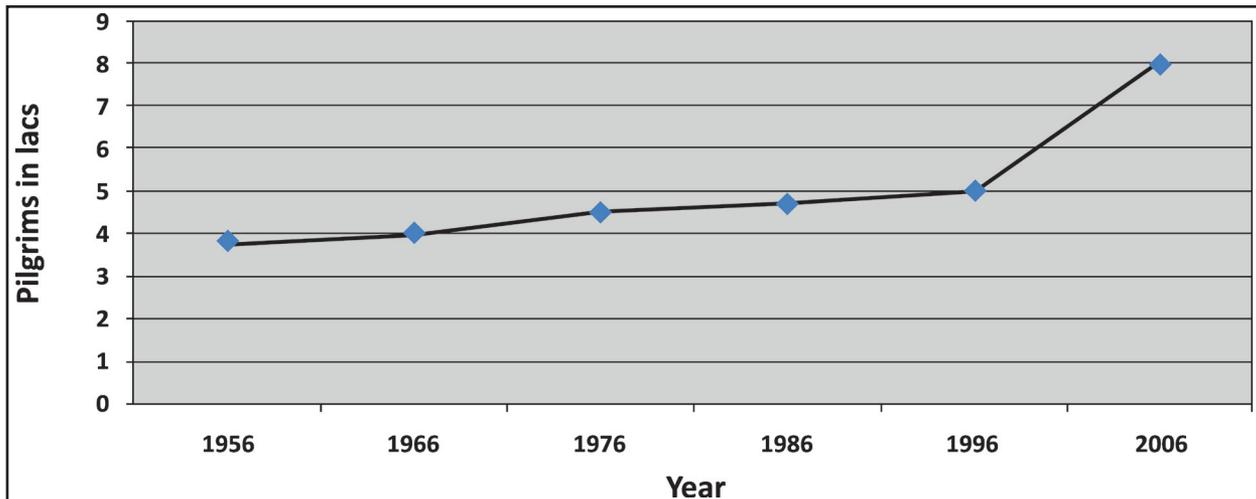


Fig. 5: Recent Trend of Pilgrims in Deekshabhoomi on DPD

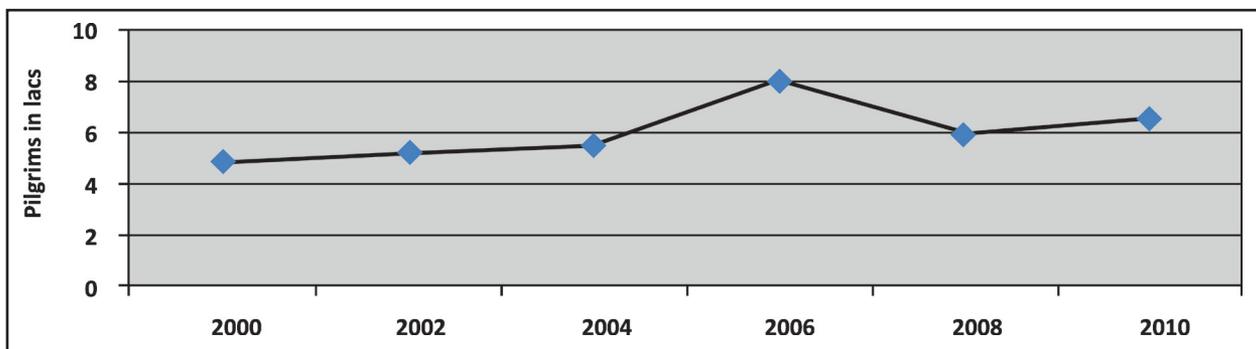
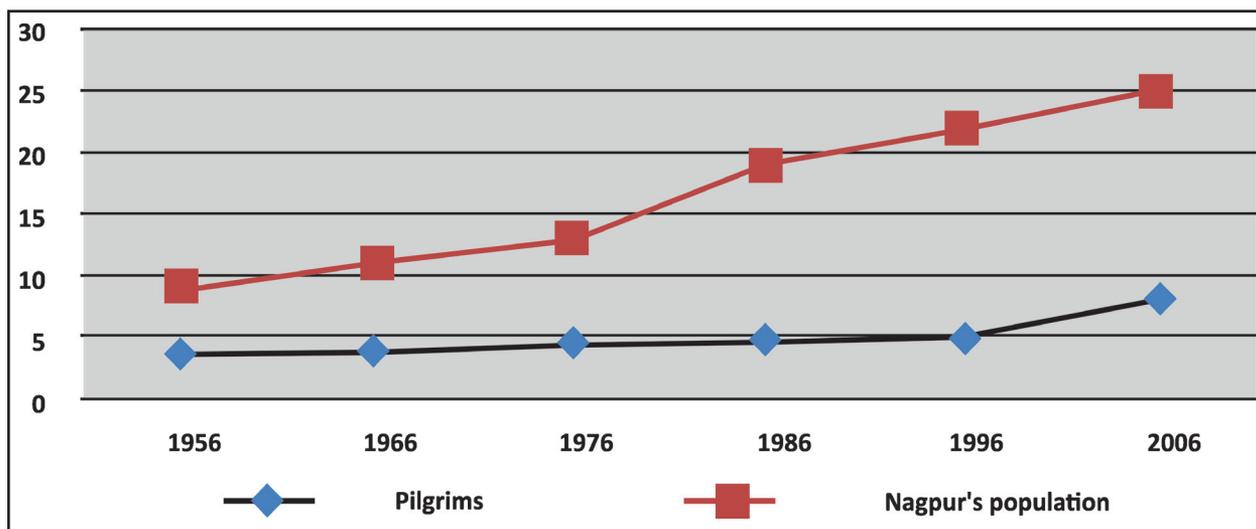


Fig. 6: Population Growth of Nagpur and Deekshabhoomi on DPD





Origin of the Pilgrims: Lot of pilgrims from India and abroad enter into the city one or two days before the actual event day. Devotees from various states of India visit Nagpur for DPD event. Very few devotees of Nagpur city, i.e. 25 percent pilgrims visit Deekshabhoomi on this mega DPD event. Sources have informed that most of the local devotees visit the sacred place 2-3 days earlier. The foreign visitors include Bhadants (Buddhist monks) and devotees from Buddhist countries like Thailand, Japan, Singapore, Malaysia, Hong Kong and few from U.S.A. (Fig. 7).

Mode of Transport: Survey findings show that about 3 percent visitors; few Bhadants (holy men) and some pilgrims from foreign countries arrive at Nagpur either by flights directly or with a combination of both flight and train. 34 percent of pilgrims reach Nagpur by train. Rest of 63 percent pilgrims use road transport facility, out of which 5 percent pilgrims have to travel both by road and railway. This shows that 5 percent pilgrims belong to very remote places from where direct trains or bus facility upto Nagpur is not available (Fig. 8). **Frequency of visits:** Fig. 9 shows that repeated visitors at Deekshabhoomi are a common phenomenon (Fig. 10) during DPD event. Thus, it is clear that most pilgrims visit Deekshabhoomi every year at this event.

Duration of Stay: Survey findings show that majority of pilgrim's i.e. 50 percent of pilgrims stay in the city for 3 days during DPD event. 23 percent of pilgrims stay only for one day. I. e. they spend the night of actual event day mostly in Deekshabhoomi premises. Other pilgrims who stay in the city for more than 3 days, they stay in the hotels or at their relatives' places. Few of them are bhadants and foreign pilgrims (Fig. 11).

Fig. 7: Origin of Pilgrims' Population in Deekshabhoomi during DPD Event

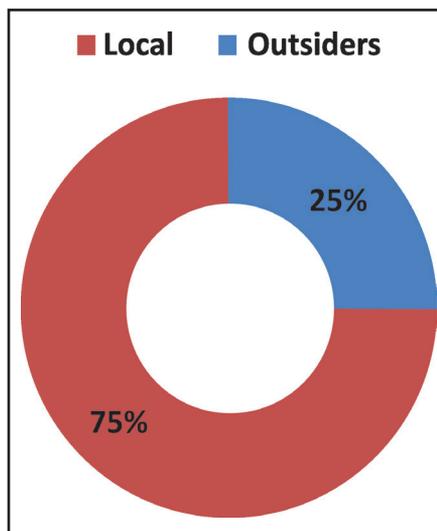


Fig. 8: Mode of Transport of Pilgrims in Deekshabhoomi during DPD Event

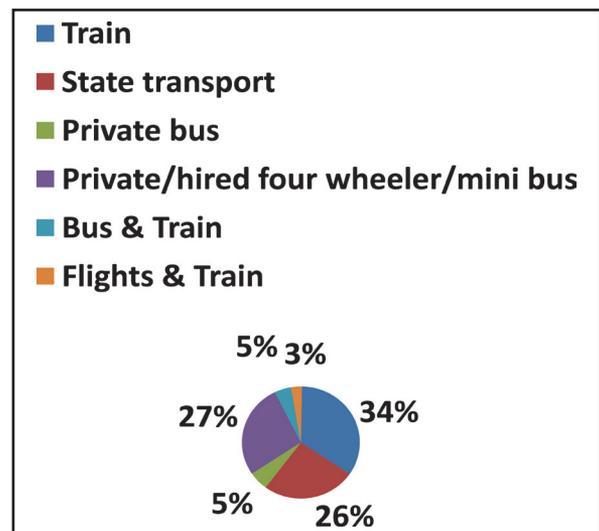


Fig. 9: Frequency of Visit of Pilgrims' in Deekshabhoomi during DPD Event

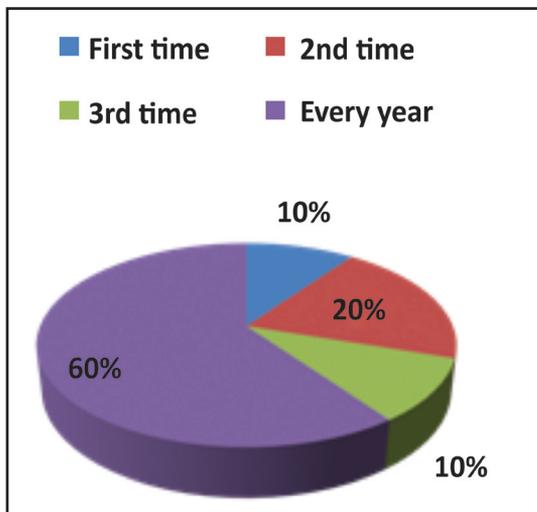


Fig. 10: Duration of Stay of Pilgrims' in Deekshabhoomi during DPD Event

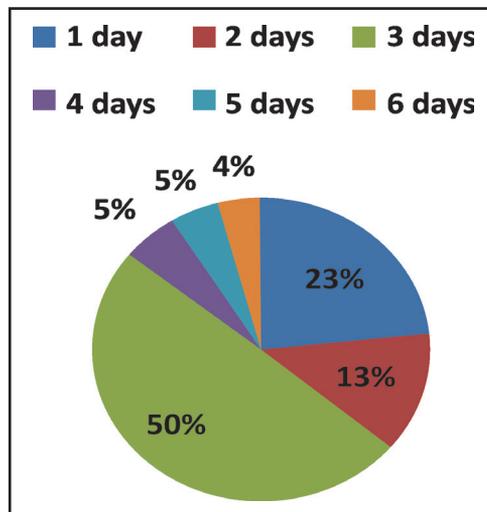


Fig. 11: Accommodation Pattern of Pilgrims' in Deekshabhoomi during DPD Event

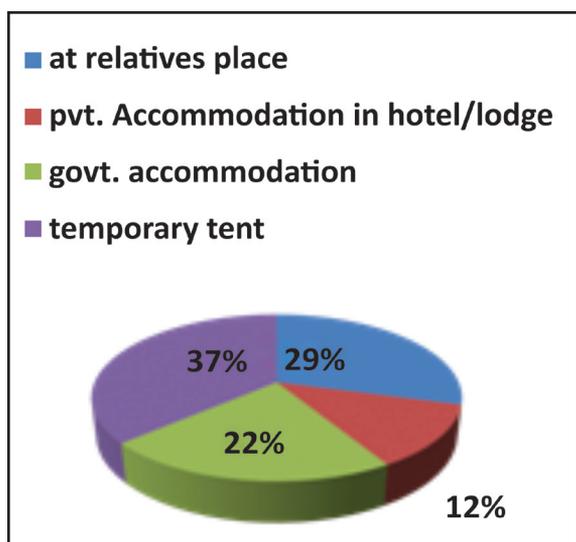
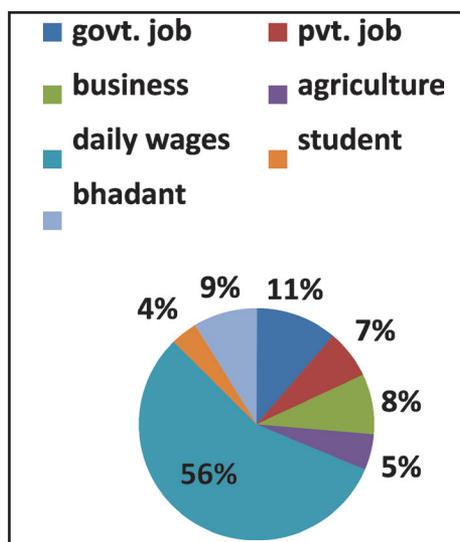


Fig. 12: Occupation Pattern of Pilgrims' Population in Deekshabhoomi during DPD Event



Occupation Pattern of Pilgrims: Large number of tourists belong to a lower income class i.e. Whose earning is on daily wage basis (Fig. 12). Accommodation: Majority of tourists nearly 37 percent of total tourists prefer temporary accommodation either open to sky i.e. In open spaces, parks of the city or in tents. The hotel infrastructure is used by just 12 percent of the pilgrims during this event. The paid hospitality services (food and beverages) are rarely used. Many tourists prefer the food donated by NGOs.



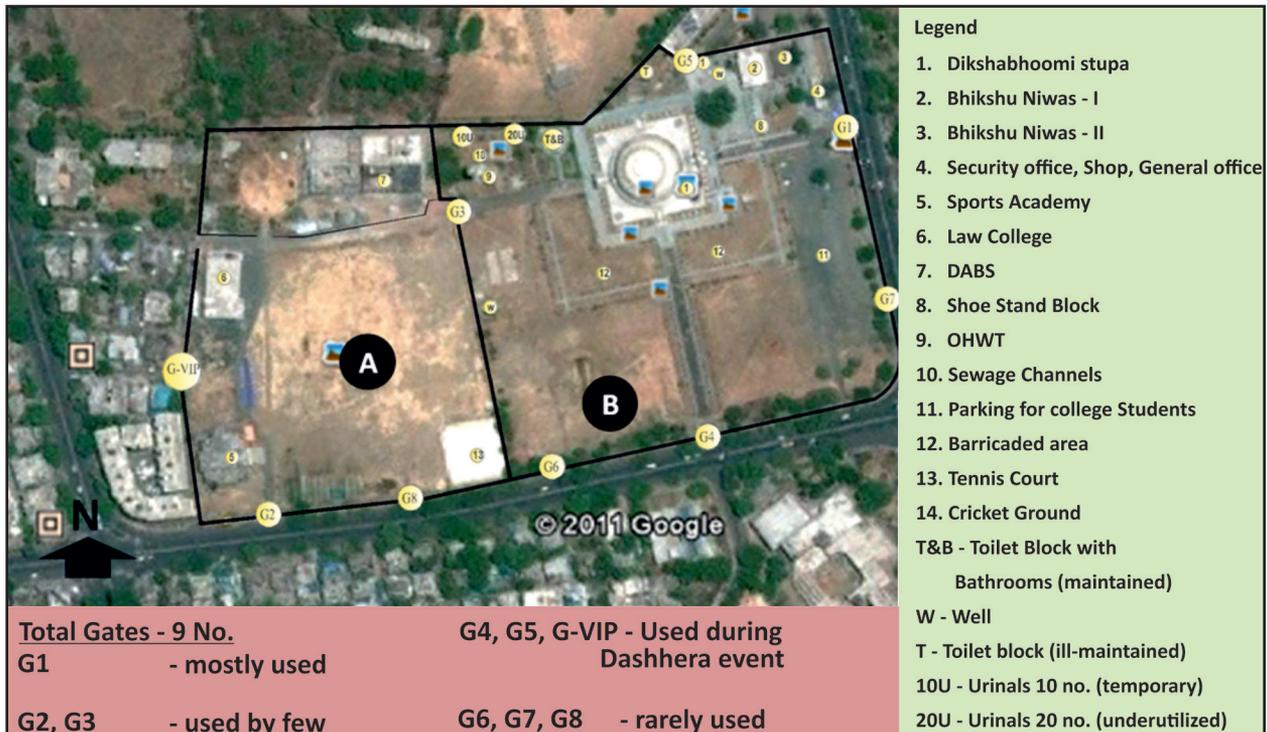
6. EVENT INFRASTRUCTURE

A detailed site analysis has been done that shows the facilities existing inside the Deekshabhoomi premises. Secondly, data Analysis of the Pilgrims' survey conducted on 14th April and an opinion survey of surrounding residents of Deekshabhoomi premises was done. Thirdly, the infrastructure provision made by various authorities at the city level for accommodation, utility services for the pilgrims during the DPD event was analyzed to find a gap in provision. As per the data received for the 2010 event at Deekshabhoomi, distribution of pilgrims was found to be 25 percent local whereas 75 percent outsiders pilgrims. The above distribution of pilgrims was considered as the base for calculating the gap in demand and supply of services for the analysis.

6.1 Site Analysis

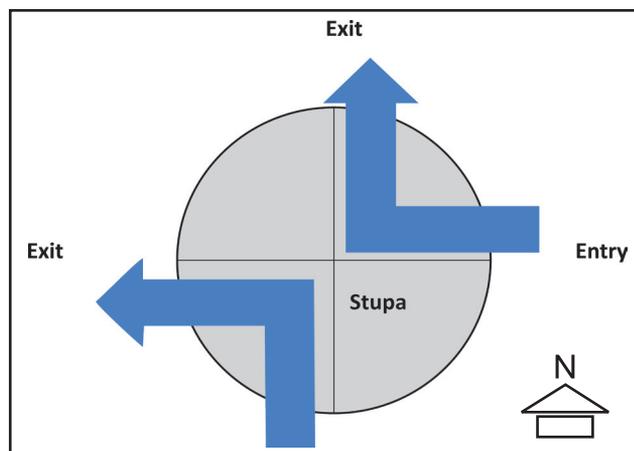
The premises of Deekshabhoomi were quite large and entirely vacant without any building since the historical conversion in 1956 to many succeeding years. After some years in the year 1964, Dr. Ambedkar College of Arts, Commerce, Science and Law College was established in Deekshabhoomi premises. Then, construction of the stupa started in 1978. Since then, many new buildings as physical infrastructure for the college came up in Deekshabhoomi premises.

Fig. 13: Details of Deekshabhoomi Site



At present, total five college buildings are standing in the premises of Deekshabhoomi excluding Stupa and its amenity structures (Fig. 13). Consequently, the effective space for the use of pilgrims during this special event is has been reducing over the years. Whereas there is a continuous rise in the number of pilgrims during the DPD event in Deekshabhoomi premises. There are total 9 gates to Deekshabhoomi premises, out of which only one gate is used by pilgrims on a regular basis and two gates are used during this special event. Out of the total 20.5 acres of area under Deekshabhoomi Smarak Samiti (A+B), 10.5 acres area (B) is consumed by stupa and its amenities and playground. Presently, only 10 acres land is left as usable space for pilgrims during this mega event.

Fig. 14: Separate Entry and Exit of Pilgrims of Deekshabhoomi Stupa during DPD Event



Among the various amenities in Deekshabhoomi premises, there are two *Bhikshu niwas* (lodging facility), well maintained toilet block with bathrooms and one overhead water tank. There are two water wells, out of which only one is used for gardening. One more toilet block including a water tank located near the gate No. 5 found to be ill maintained. Two utility blocks with 30 urinals without roof (open to sky) are also found. Apart from all above, permanent open sewage channels are existing near gate No. 3 for the provision of temporary toilets during DPD event. According to the data received, about 50-60 pilgrims are allowed at a time in the hall of Deekshabhoomi Stupa during DPD event. The four gates of Deekshabhoomi serve the purpose of two separate entry and exit to Stupa (Fig. 14). Nearly 70-75,000 pilgrims occupy Deekshabhoomi premises on the major DPD event day.

6.2 Survey Findings: Data Analysis of Survey Conducted on 14th April

- Majority of devotees stay in Deekshabhoomi campus from morning till evening;
- Absence of shelter in hot summer of Nagpur;
- Inadequate facility of drinking water;
- Inadequate toilet facility; and
- No arrangement of temporary toilets on permanent open sewage channels.

Data Analysis of opinion survey of surrounding residents:



- 40 percent of surrounding residents leave their houses during the event period and goes out for trips or stay at relatives' places;
- Female pilgrims request for using toilet at residents' houses;
- Surrounding areas, footpaths are used for sleeping at night;
- Open defecation in the surrounding streets or lanes;
- Open defecation in 20 percent surrounding residential plots; and
- Inadequate facility of drinking water.

6.3 Infrastructure Provided at City Level

Accommodation: According to data collected from NMC about arrangements for accommodation of pilgrims, temporary waterproof *pandols* are provided in the open grounds of surrounding institutional premises. Data analysis infers that provision by NMC is only 2 percent of the total requirement of accommodation space for pilgrims. This shows that there is a huge gap in the accommodation infrastructure for pilgrims. Alternatively, pilgrims spend their night on the ground of Deekshabhoomi, open spaces of neighborhoods like Laxmi Nagar and some pilgrims also sleep on the footpaths of surrounding areas. Some of the pilgrims take shelter in some of the Buddha Viharas of Nagpur. It is observed that pilgrims prefer staying either on Deekshabhoomi premises or in nearby areas, mainly due to their spiritual attachment with Deekshabhoomi and also to avoid transportation time. Pilgrims want to spend their most of the time in this holy site during their stay in the city.

Utilities and Services

Water Supply: Nagpur municipal corporation supplies the drinking water for the pilgrims of Deekshabhoomi during DPD at various places of the city through different sources. Since last few years, water supply near the spots of food donation, *pyaoo*, by 10 tankers is arranged in the vicinity of Deekshabhoomi premises and few identified nodes of the city such as ajni Railway Station, Wardha Road to Buldi, Gayatri Nagar, Subhash Nagar and Ambazari Garden. Water supply for temporary toilets and bathrooms is also made available by NMC. The data collected from NMC implies that total 202 temporary taps from permanent water pipes (isolated C.I.) were provided specially for this event from Rahate Colony to Chitrakala Mahavidyalaya, V.I.P. Road to Deekshabhoomi, Kachipura Square, Central Bazaar Road, Deekshabhoomi premises I.T.I. Campus, Andha Vidyalaya and government. Health Dept in october 2010. The other urban local body of the city i.e. NAGPUR Improvement Trust also supports NMC for this mega religious event. Two higher capacity tankers for supply of drinking water to various *pyaoo*s which were installed for the pilgrims at various locations of the city were provided by NIT in Oct 2010. Table 15 shows the details of drinking water provided by NMC and NIT during the desired event at Deekshabhoomi premises and surrounding areas. Total water supply for the pilgrims of Deekshabhoomi during Dashhera

Fig. 15: Gap in Water Supply and Demand for Pilgrims of Deekshabhoomi during the Event

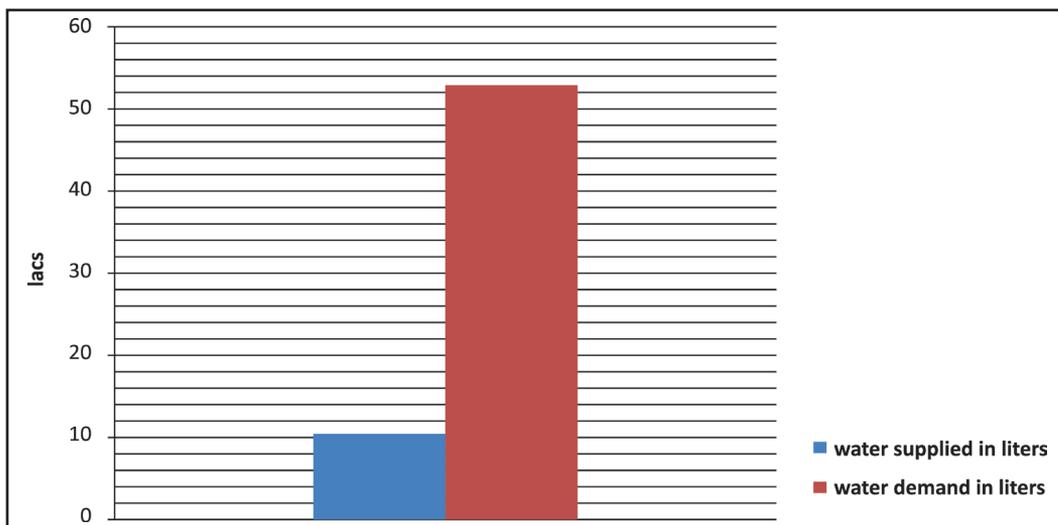
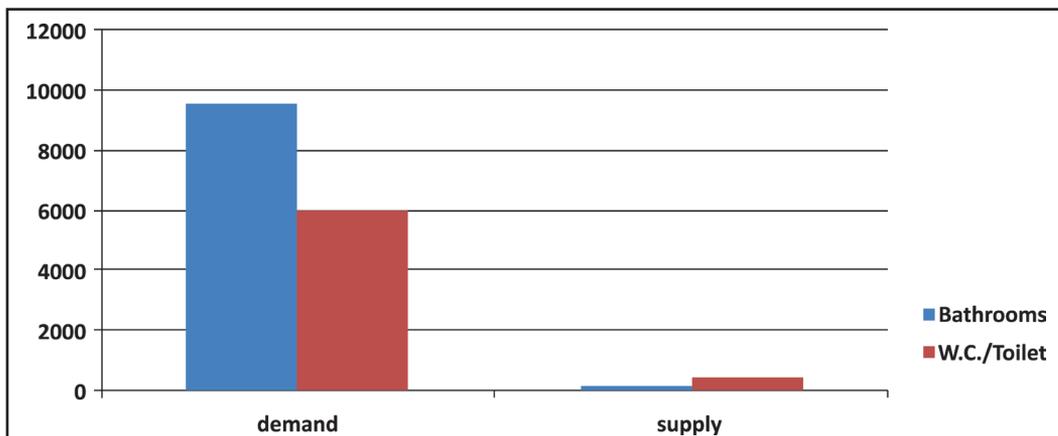


Fig.16: Gap in Utility Services for Pilgrims at Deekshabhoomi during the Event



was 9,89,000 litres. Whereas the total water requirement for this event was 53 million litres. Drastic difference in water demand and water supplied indicates that pilgrims of Deekshabhoomi faced a shortage of water during DPD event.

Bathrooms and Toilets for Pilgrims: Secondary data obtained showed that provision of temporary bathrooms and toilets is done in Deekshabhoomi campus for devotees residing in temporary accommodation. Still, survey findings show a huge gap in number of bathrooms required by pilgrims. Due to shortage of bathrooms and water for bathing purpose, many pilgrims take bath in the nearby Ambazari Lake. Pilgrims who come from villages are generally used to this habit of taking a bath in natural water bodies. However, the chances of drowning cannot be fully ruled out.



Total 442 temporary toilets were provided by NMC pilgrims of Deekshabhoomi whereas total 6000 water closets were required. Total number of temporary toilets provided were not in proportion to the needs of such a huge crowd visiting Deekshabhoomi. It has been informed during the opinion surveys of surrounding residents that absence of toilet facility leads to open defecation which causes unhealthy environment in the surroundings of the sacred site of Deekshabhoomi.

7. DISCUSSION

Although, the sacred site of Deekshabhoomi observes considerable movement of devotees throughout the year. But unlike Tirupati or Pandharpur, the importance of getting Darshan of the statue of Buddha and Dr. Ambedkar on Deekshabhoomi is only for one specific day i.e. on Dashhera. So time slot arrangement for allowing *darshan* to avoid crowding, cannot be applied in Deekshabhoomi. Due to the inadequate institutional framework and financial crunch of the Smarak Samiti, it is not possible to cope up with the demand for provision of utilities and services of ever increasing pilgrims participating in the DPD event. Insufficient accommodation facility, inadequate toilet facility results into the unhygienic environment in the surrounding localities after the DPD event is over. According to the secondary data collected, NMC had arranged collection of solid waste during the three days DPD event 24 hrs in three shifts. Still, it was observed that during the survey there was no check on the generation of a large quantity of waste. Further transportation and disposal of this large quantity of solid waste become burden on the existing weak Solid Waste Management System of Nagpur. During the DPD event, many temporary stalls for selling or exhibiting items like Buddha idols, Ambedkar literature, etc.; are arranged for visitors on the footpaths of the East High Court Road abutting Deekshabhoomi premises. These stalls block the space of pedestrian movement during the event. In 2010, as per the instructions of Special Branch, Police Department, stalls were allowed only on the opposite side of the east high court road abutting Deekshabhoomi premises and not on the side adjacent to Deekshabhoomi premises.

8. RECOMMENDATIONS

8.1 Policy Prescriptions

Few policy based recommendations demand special institutional framework and capacity building of urban / rural local bodies that organizes huge religious events. First of all, it is necessary to form planning and management guidelines prescribing certain norms for organizing religious events which will be common for the religious event of all the religions of the nation. Religious Event Management Cell (REMC) be established in urban local bodies of the major pilgrimage centres (cities) in the country which will work out the budget for the event and will be responsible for smooth conduct of the event. All the NGO's supporting the religious event will need to consult the REMC to have efficient coordination.



8.2 Capacity Building

For a smooth management of religious events in pilgrimage centres, it is necessary to augment the resources of local authorities or install additional institutional mechanisms. Separate staff should be employed for supervision of smooth and efficient usage of utility services provided for the event. Capacity building of religious institutions is of utmost importance for the better host courtesy. Strong institutional arrangement by religious bodies to maintain detailed data base of pilgrims' population would facilitate disaster management in case of any eventuality. Hosting and managing one million pilgrims during 3-4 days at a particular place is not an easy task for any government or agency. In spite of the concerted efforts of NMC, there is still room for improvements of pilgrims' facilities in Nagpur to maintain the quality of services.

8.3 Spatial Planning and Land Use

Development of a common congregational center in Nagpur with accommodation facility; and model camping sites for the accommodation of pilgrims need to be identified in the city. Some of the management tips, if properly implemented, can go a long way in improving the quality of the pilgrimage experience, for example, registration of local pilgrims before one month prior to Dashhera and Zonewise registration of outsiders pilgrims / leaders at transit nodes. Moreover, distribution of identity tags at transit nodes and entry gates for pilgrims from different zones in Deekshabhoomi and Zonewise space allotment for pilgrims in Deekshabhoomi premises by the staff of religious event management cell will prove to be helpful in managing large crowd during peak period. However, registration of each and every pilgrim will be a time consuming process. But to generate a proper record of pilgrims visiting in and out of Nagpur, the entry should be restricted without identity tags. It will help to identify the direction i.e. major arteries from where the highest influx of pilgrims arrives in Nagpur. So, it is suggested that though the registration being lengthy, it is required to be followed at least for initial 2-3 years until a proper database for the event is achieved.

8.4 Infrastructural Arrangements

Urban local bodies in all the pilgrimage centers should provide minimum infrastructural services mandatorily for the expected pilgrims; for example public bus transport from the main railway station to the venue of religious event and utility services like regular maintenance of public toilets.

- **Accommodation:** Event Management Cell formed under NMC, will look after the accommodation of pilgrims in all ZP and NMC schools located near the transit nodes. There are about 300 Buddha Viharas in Nagpur. Due to limitations experienced in data collection, approximate calculations for finding the capacity of Viharas were done, which implies that the existing

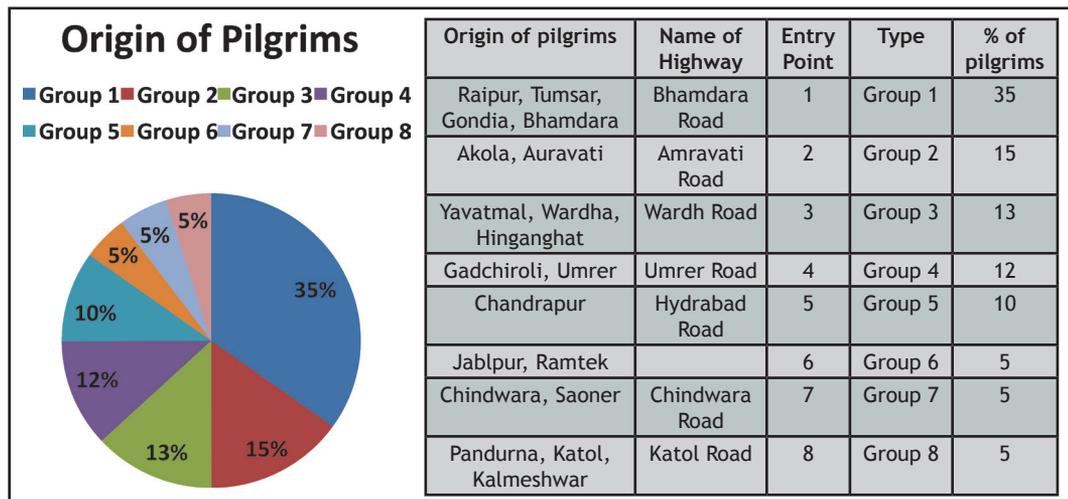


Viharas of the city could solve the problem of pilgrims’ accommodation to a greater extent, provided proper transportation and guiding facility regarding the locations of Viharas is given to pilgrims.

- **Utility Services:** Firstly, the toilet blocks existing inside the premises of Deekshabhoomi, should be well maintained and made available for the use by pilgrims during all major gatherings. The two water wells, existing inside the premises of Deekshabhoomi shall be cleaned periodically and recharged during rainy season. The well water can be used for all other purposes except drinking by pilgrims.

Few temporary bathrooms can be constructed in the premises of NMC Schools. The waste water generated can be used for gardening purpose. Few temporary bathrooms can be constructed on identified camping sites. To reduce the burden on NMC for water required for bathing of pilgrims, few lakes of the city namely Ambazari Lake, Sonegaonlake, Naik talao and Lendi talao can be the probable sources of water. It is important to specify here that the above water sources are not used for drinking water supply by NMC. All the existing public toilets of the city should be maintained regularly and made accessible to the pilgrims of Deekshabhoomi during the special occasions. Two mobile toilets should be provided at all the transit and entry nodes. On camping sites, temporary toilets of the privy pits type can be provided which can be covered after the event and used as manure for the agricultural land. To avoid transportation of solid waste to a municipal storage point, vermi - composting unit for treatment of solid waste should be installed in the premises of Deekshabhoomi near toilet block No. 2. This will prove to be an environmentally sound solution and can earn some profit to the Smarak Samiti. The process of vermi - composting can only be applied to organic or biodegradable waste. So, initially segregation of

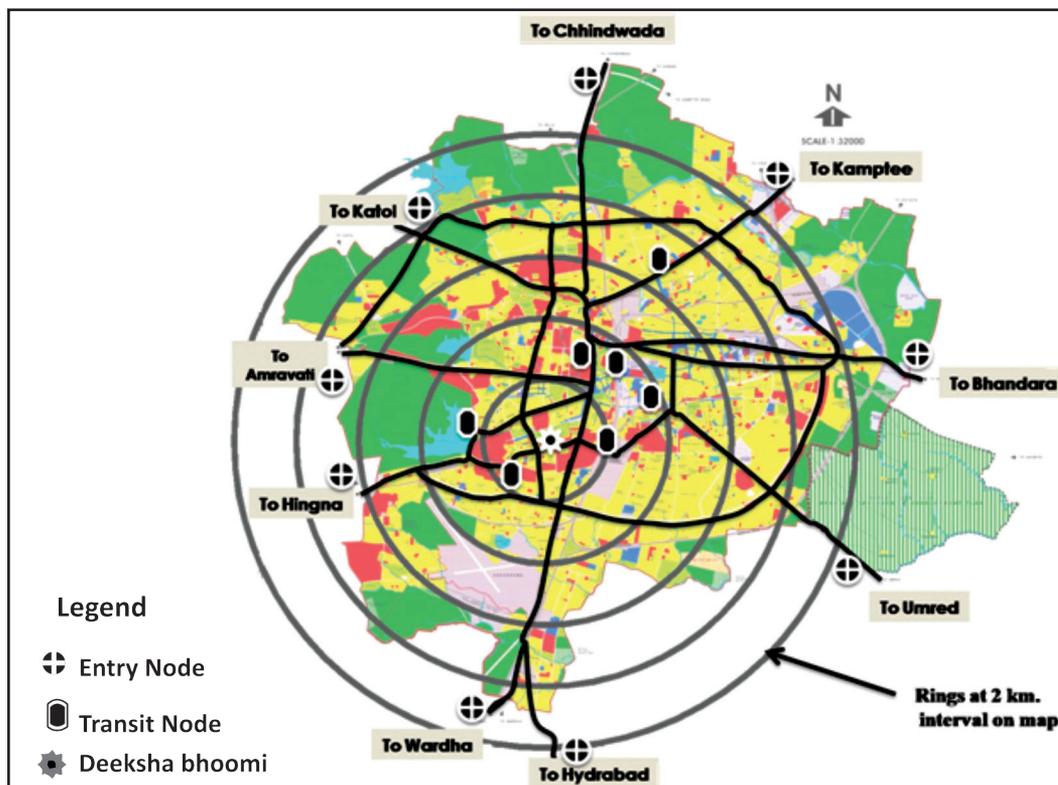
Fig. 17: Distribution of Pilgrims’ Population in Deekshabhoomi during DPD Event



garbage will have to be done. All the non - biodegradable materials like glass, metal, plastic need to be separated and can be sent for recycling process.

- Pilgrims Flow Management:** The various transit nodes are shown in Fig. 18. However, the survey findings regarding the mode of transport of pilgrims show that highest number of pilgrims; i.e. 34 percent visitors reach Nagpur by train. There are two railway stations in Nagpur; namely Nagpur Main and Ajani. Ajani railway station is quite near to the sacred site of Deekshabhoomi. It has been observed that majority of pilgrims reach to the sacred destination of Deekshabhoomi on the feet. So, it is clear that the crowd intensity would be highest at Ajani railway station. Total 63 percent pilgrims travel by roadway to Nagpur. Out of which, 26 percent of pilgrims travel to Nagpur by state transport i.e. MSRTC. So, MSRTC bus stand also found crowded with pilgrims during DPD event. For easy dispersal of the pilgrims' crowd from the main railway station, Ajni railway station and MSRTC bus stand to Deekshabhoomi, direct public bus services shall be provided at frequent intervals. The other 27 percent visitors using the roadway, travel by private or hired four wheelers or mini buses. This category of pilgrims needs substantial space for parking in the city. It was observed that the NMC provides few open lands in nearby

Fig. 18: Map Showing Deekshabhoomi, Various Transit Nodes and Entry Nodes on Development Plan of Nagpur





areas of Deekshabhoomi for parking of these vehicles. To identify the most congested traffic artery (national / state highway) of the city during DPD event, the above 27 percent pilgrims were categorized in separate zones depending upon the pilgrims' origin. It was found that most pilgrims i.e. 35 percent of total pilgrims travelling through private transport; come from the state of Chhattisgarh and enter into Nagpur city via Bhandara Road. This data will be useful to decide the hierarchy of information and amenity center for pilgrims on various traffic arteries of the Nagpur city.

To study the management of flow of people and influence zone of religious event of DPD, the location of various entry nodes and transit nodes were marked on the Development Plan of Nagpur city. Considering Deekshabhoomi, the focus of the event as the centre; circular rings at 2 km intervals were marked to identify the effective influence zone of the religious event. The findings emerged show that the major influence zone of DPD event exists within a radius of 4 km from the sacred site of Deekshabhoomi, which includes maximum number of transit nodes. For proper management of pilgrims' flow the nodes at (i) Main Railway Station, (ii) Ajani Railway Station (iii) MSRTC Bus Stand (iv) Madhya Pradesh Bus Stand (v) Indora Square (vi) Rahate Colony, (vii) Wardha Road (viii) Reserve Bank Square (ix) NMC Control Room (x) Matakacheri and (xi) ITI premises should act as transit and guiding points at city level. Pilgrims arriving one day prior to event day, can be shifted through special bus service from these nodes to nearby NMC Schools or Buddha viharas as per availability of accommodation.

9. CONCLUSIONS

Travel to pilgrimage centres has become more frequent due to increased accessibility and availability of transport (Bhardwaj, 1973; Gladstone, 2005; Richter, 1989; Singh, 2004). On the contrary, pilgrimage is considered as an additional burden administratively because a local authority has to provide services for the visitors even if it does not receive any profit from them.

Generally local authorities see pilgrimage as an occasional event and manage it accordingly by providing temporary accommodation and sanitation facilities for pilgrims with almost no thought towards improving environmental conditions (Shinde, 2004). The National Tourism Policy recognizes such issues of added responsibility towards visitors and places a special focus on the engagement of stakeholders in the management and promotion of tourist destinations (DST-FICCI, 2002). This position can be extended to include pilgrimage centres and religious events as well. Our survey shows that more persons have died in the country in religious stampedes than in terrorists bomb blasts (Vij, 2009). Keeping this in mind, prevention strategies for reducing risk to crowds should be incorporated for smooth management of such mega religious events. Systematic and healthy management practices do not seem to affect the spiritual magnetism



of pilgrimage centres and as such there is no evidence of decline in the popularity of pilgrimage centres due to strict rules for pilgrims. However, it is highly likely that for a majority of visitors, physical environment resulted from perfect management may influence mental, emotional and spiritual experiences. The present paper is an initial attempt to study effects of a mega religious event i.e. DPD on Nagpur. This study analyzes only infrastructural requirements during the pilgrimage days and suggests feasibility of options to meet these requirements.

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Walkability of Transit-Oriented Development: Evaluating the Pedestrian situation of Faridabad Metro Stations

Satpal

Abstract

Walkability is one of the most important key elements in encouraging people to walk for transportation under the concepts of transit-oriented development (TOD). TOD represents an integrated approach to transportation and land-use planning. The key component to TOD theory rests in the pedestrian access between the mass rapid transit stop and the surrounding areas. The success of any TOD rests on the capacity of pedestrians to access the land uses in close proximity of transit station. In most locations, the capacity to walk is based on the same infrastructure as the ability to drive. While there are many ways of evaluating TODs, many researchers argue that assessing the walkability of these neighborhoods is the best way of assessing their functionality. The purpose of this study is to measure the walkability on the basis of connectivity at the given stations. Catchment analysis using pedestrian catchments (or ped-sheds) can then be used to ascertain the development and population potential of a TOD, and then this can be checked against the transit capacity of the transit corridor and its stations.

1. INTRODUCTION

Walkability is the extent to which the built environment supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network. Walkability represents the facility to walk in a location, but the walkable location has to meet several situations, quantitative - related to the physical built environment characteristics, and qualitative - related to public values and the aesthetic value of the location.

Recent years have seen a rise in popularity and use of walkability due to connectivity of metro as transit. Many cities and regions include walkability goals in their land use and transportation plans. However, many of these goals are quite general and vague and difficult to quantify. By measuring both form and content of neighborhoods, walkability indices such as 'pedshed' are expected to measure the degree to which an area can provide opportunities to walk to various destinations. In most locations, the capacity of walk is based on the same infrastructure as the ability to drive; the street network. Understanding opportunities for pedestrian movement should be the key

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component in understanding and evaluating transit oriented development (TOD).

A good walkable urban form, therefore, can be a key contributor to local mobility and thus, walkable distances range from 400 meter (5 minutes walk) to 800 meter (10 minutes' walk). Thus, urban form at a neighborhood level is an important variable that will allow a resident to exercise a non - motorized Transit (NMT) system and because TODs represent both local and regional mobility, street and character of immediate surroundings, a neighborhood linkage with a rail station, as well as the location of a neighborhood within the larger region may influence regional household travel behavior for neighborhood residents. The existing street network often provides a key indicator of the walkability of TOD environments, especially in more urbanized areas where off-street paths may be less likely to exist.

2. THE CONTEXT OF WALKING AND URBAN DESIGN

Visualizing urban form is also an important component to understand walkability, especially for public understanding and participation in the planning process. Lynch, one of the foundational observers of urban form, identified five basic components of urban form - path, edge, districts, nodes, landmarks-each of which can be conceived in terms of a walkable urban network. Paths can be thought of as minor roads; edges equate to freeways or other large roads (e.g. arterials) that impede pedestrian movement; districts can represent concentrated zones of walkable urban form; nodes represent street intersections; and landmarks represent key origins or destinations, such as transit stop. Each of these elements can be measured spatially.

Urban design consists of architectural form and open space in a community context. Urban design suggests serious collective concern for three- dimensional space and gives as much consideration to public areas between or beneath buildings as to the buildings themselves. The attractiveness of a place for walking and the experience of walking activity are inextricably tied up with urban design. Understanding the context of urban location is essential to ensure that development is connected to and integrated with surrounding areas, including planned and un- planned development.

The key tool for context analysis is walkable catchment or pedshed which is the actual area served within a 400 m (5 minute) or 800 m (10 minute) walking distance along the street system from a public transit system (MRT, BRT), town or neighborhood centre. A distance that can be comfortably walked in 5-10 minutes and a distance most people are willing to walk to



train stations or other community uses. These areas include mixed uses, pedestrian connections, and traffic calming design. 'Pedshed' mapping can be used either to:

- Analyze the walkability of existing centres and thus determine where changes can be made to the street network to benefit pedestrian accessibility; or
- Analyze a proposed street network at design stage to help refine it to maximize walkable efficiency.

3. FARIDABAD: STATEMENT OF PROBLEMS

Faridabad is a major industrial and most populated city in Haryana. It contributes substantial income and revenue to Haryana as over the years it has developed into an industrial, IT, BPO and commercial hub. Faridabad is an important constituent of NCR, which was formed to develop a region around Delhi so as to divert increasing pressure of population from Delhi. There are lots of office buildings, residential housing, industries, entertainment buildings, shopping malls throughout the area.

The case study area in Faridabad has four metro stations namely Old Faridabad, Neelam Chowk Ajrona, Bata Chowk and Mujesar Escorts Metro station. This area falls under the 800 m MRTS corridor "influence zone" within its precinct area. The area has Railway line running along it with Old Faridabad and NIT Faridabad stations in the study area.

Recently, creating pedestrian-friendly environment regarding TOD has received a great deal of attention in many parts of world because it is believed to be the principal component to future urban planning and design, leading people to walk and taking transit over driving. Therefore, this study is to measure how unfriendly an area is to walking at a given metro station by collecting evidence from physical environment. This research will help increase understanding how to improve or develop appropriate pedestrian environment of future metro stations so as to increase walking as the primary access mode to stations.

Transit oriented development (TOD) has long been promoted by advocates of 'new urbanism' and 'smart growth' as a more walkable and livable alternative to suburban sprawl (CNU, 1998; Ewing, 1999). Through their easy access to transit, residents of TOD neighborhoods can experience lower transportation costs by the money saved from not having to own a car (Belzer and Autler, 2002). TOD not only provides them with this mobility choice but also in theory a wider choice of retail and housing type that current auto-dominated



suburbs do not provide. By walking more these residents can enjoy safer, more socially connected communities and they themselves can be healthier (Brown et al., 2007; Moudon *et al*, 2006; Schlossberg, 2006). Research has also shown that TOD neighborhoods report less traffic than conventional suburban neighborhoods (Cervero and Arrigton, 2008). If it functions correctly, this type of development can provide many of these benefits to residents, employers, transit agencies and governments, leading to healthier and more sustainable urban areas.

4. TRANSIT ORIENTED DEVELOPMENT AND WALKABILITY

Transit oriented development is mix of residential, retail, office, open space, and public uses within comfortable walking distance, making it convenient for residents and employees to travel by transit and walking. Well-planned neighborhood can increase the number of people walk or cycle to shops, parks, services, facilities and public transport. There are a number of ways to describe how places are put together and their influence on transportation and complete streets. One of the more popular ways to describe the relationship is through the “three D’s”: density, diversity and design, which influence people choosing to walk.

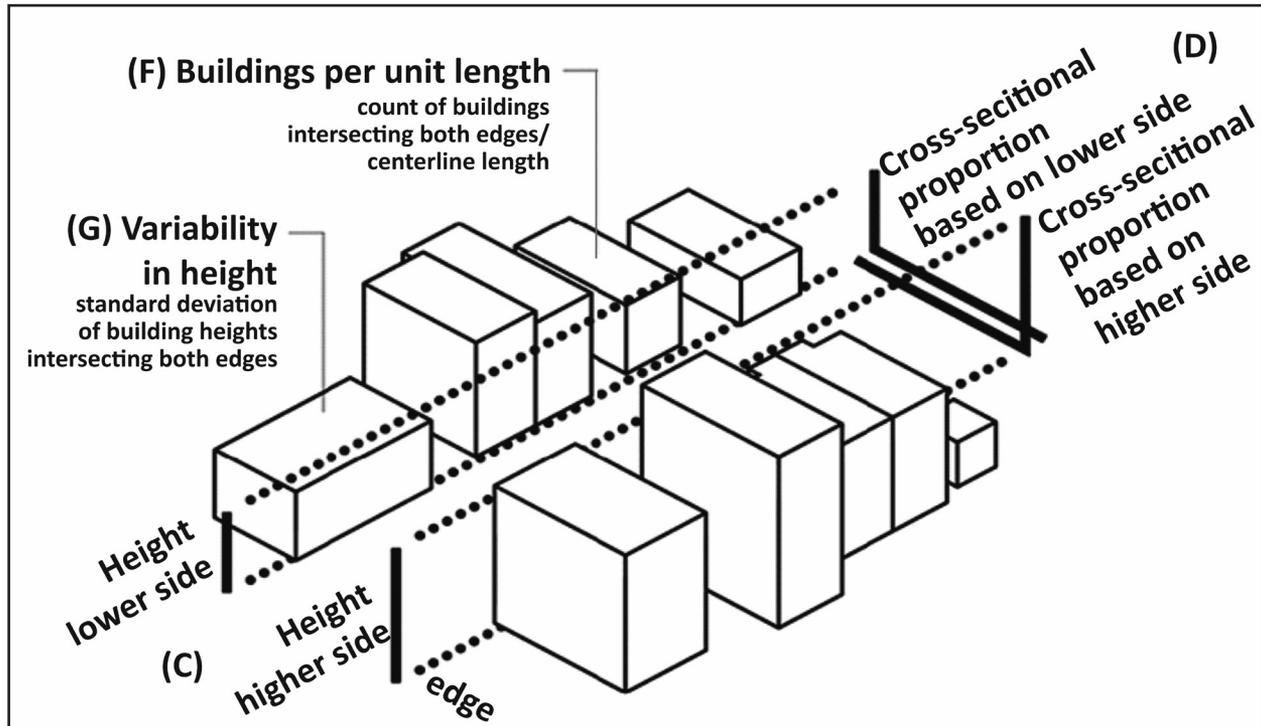
4.1 Density

Density describes how close or far apart households are located to each other. The higher the density, especially around a transit stop or station, the more residents will be within proximity of the transit stop or station, which will then improve people walk and riding public transport. People living in densely populated areas are much more reliant on walking than households residing in the suburban or rural regions. Low density residents are expected to be less likely to walk for all walking distances than high density residents. Hence, the wisdom of higher densities is that it would compress activities into a small area which allow people to walk, instead of driving, to almost everything within reasonable distance.

4.2 Diversity

Diversity refers to the mix of uses within a given place. Mixing land uses in and around accessible transit station creates opportunities for people to live near shops, public transport and other services, making them more accessible by walking rather than by car. This can be enhanced by ensuring all compatible neighborhood activities are co-located within or near the transit station. It is fair to conclude, accordingly, that more mix uses in a neighborhood and around a transit station would encourage people to walk to destinations including the transit station.

Fig. 1: Skeleton Variable Geometry.



Source: Harvey, Chester Wollaeger. "Measuring Streetscape Design for Livability Using Spatial Data and Methods (2014). University of Vermont Graduate College Dissertations and Theses. Paper 268.

4.3 Design

Design addresses how places are put together in terms of the orientation of buildings, placement of parking and open space, etc. Traditional city layout with interconnected street network is an important factor in influencing people to walk. Good street layout design is best to combined with some weather protection. Canopies, awnings, and arcades are common urban design features that would protect pedestrians as well as transit walkers. Trees planted between the street and sidewalks provide a physical and psychological barrier between large mass vehicles and small mass pedestrians for visual relieve.

Walking is the most natural form of physical activity and most basic mode of transport. Walking is the most basic urban transport mode that has allowed cities to operate. A comprehensive review of the subject by the originator of the exercise / health relationship concluded that 'walking is the nearest activity to perfect exercise'. Walking has been mentioned in the initiatives as a mean to reduce automobile uses. We look in turn at some of the possible benefits and limits of walking.



Table 1: Benefits and Limits of Walking

Benefits and Limits of Walking	
Benefits	Limits
The walking mode involves very little expense, either public or private.	Human does become tired, rather quickly. Studies shows acceptable access distance to a transit station on foot is 400m.
Health benefits; yet walking is the most basic form of exercise	Speed: For short distances, the slow pedestrian speed does not matter, but it becomes a factor with longer trips.
Availability: The mode is always present and ready for use (within reason).	Adverse weather will reduce considerably any propensity for walking.
Certainty: A pedestrian is in direct contact with the surrounding environment so are others nearby.	Pedestrians have limitations including how much weight they are able or willing to carry with them.
Environmental Friendly	Safety may be a concern for vulnerable

5. TRANSIT USERS' WALKING DISTANCE

Transit oriented development is typically studied at the scale of a 5 minute walk from the station (400 m or ¼ mile) for Bus Rapid Transit (BRT) Service, or a 10 minute walk (800 m or ½ mile) for Mass Rail Transit System (MRTS Calthorpe, 1993), but this distance varies depending upon topography and street type. Calthorpe's 800 m standard however has generally been accepted since its inception, and such was the measure used for the present study. An average walk is at a speed of 2.5 miles per hour. This converts to 13,200 feet per hour or 220 feet per minute. On this basis, a 5 minute walk would be 1,100 feet and a 10 minute walk would be 2,200 feet. There are many potential pedestrian conditions that enhance or impede one's ability or desire to reach a transit stop, including safety issues, the existences of appropriate paths, and an interesting view scape at pedestrian scale.

6. WALKABLE CATCHMENTS AND PEDSHED: A PLANNING TOOL

A walkable catchment is the area covered by the walking distance that an average person will walk to get to metro transit station before considering other

Table 2: People's Tolerance for Walking

	Minutes	Meters
In a highly attractive, completely weather-protected and artificially clematises environment	20	1600
In a highly attractive environment in which sidewalks are protected from sunshine and rain	10	800
In an attractive but not weather-protected area with footpath during periods of inclement weather	5	400
In an unattractive environment without footpath (parking lot, garage, traffic-congested streets)	2	200



modes of transport. Pedshed is short for pedestrian shed, the basic building block of walkable neighborhoods. A pedshed is the area encompassed by the walking distance from a neighborhood center or transit node. A walkable catchment with a 400 metre radius is usually associated with a five-minute walk and an 800 metre radius is associated with a 10 minute walk to a place with a major transport service such as rail to his home or vice versa.

There is no definitive authority on why a walkable catchment should be 400 or 800 metres or any other distance, but what is commonly agreed is that the walkable catchment area is an easy walk for the average person. It is generally accepted that a typical pedestrian could walk 400 meters in 5 minutes and 800 meters in 10 minutes. Based on these distances, walkable catchments are usually drawn and measured along the actual route and not 'as the crow flies' over a transit station, but in practice walkable catchments have irregular shapes because they cover the actual on-the-ground distance.

What makes a neighborhood, a corridor, or a street walkable? Having destinations nearby and in close proximity is important, but it doesn't tell the whole story. Not all walks of the same distance are of the same quality. How far a pedestrian is willing to walk to and from various destinations, whether a visitor or neighborhood resident, also depends on whether the walk is interesting, safe, and convenient.

A "reasonable" walking distance is likely to be affected by location, topography, weather, pedestrian facilities, trip purpose and cultural factors. While a five minute walk (the time taken for the average person to walk 400 meters) may seem like a reasonable benchmark, it will not provide for a person's daily exercise needs alone. More recent studies have shown that people are willing to walk much greater distances if the walking environment is favorable (an average of 1.2 km in good conditions).

7. MEASURING AND QUANTIFYING WALKABILITY

People need access to facilities to use them. The structure of the urban environment is fundamentally important in offering this choice. High capacity metro rail stations generally stimulate development activity within a half mile walking distance from the station. Two primary techniques have been used to rank and compare the grain and connectivity of four Metro station areas as TODs in Faridabad city namely Old Faridabad, Neelam Chowk Ajrona, Bata Chowk and Mujesar Escorts Metro station areas.

7.1 Pedestrian Catchment Area Analysis or Pedshed Analysis

"Pedestrian Catchment Areas" (also known as Pedsheds) are theoretical walkable zones that can be mapped to show the actual area and network within 5 minute

(400 m) or 10 minute (800 m) walking time from a mass rapid transit station. The result is a ratio that measures an area that a pedestrian is likely to actually travel. “Pedshed” or walkable catchment mapping helps designers to assess a street network regarding access to a centre. A supportive street environment helps the viability of centres and transit.

Pedsheds measure the accessibility of a given location based on a ratio of Euclidean distance to street network distance. This analysis calculates a number that represents how walkable a space is. This analysis was to be conducted for the TOD areas prior to and after construction / designation. “Pedestrian Catchment Areas,” (also known as Pedsheds) are theoretical walkable zones that can be mapped to show the actual area and network within a five-minute (quarter-mile) or ten minute (half-mile) walking distance from a transit stop. The data is presented as a ratio between the Euclidean distance and the network distance from a given point (e.g. transit station). The resulting maps are also highly visual estimates of an area’s walkability. Pedshed analysis aims at identifying the permeability of the street network for pedestrian.

The Pedestrian Catchment Area (PCA) methodology focuses on capturing the coverage of a street network within the designated TOD and determining how accommodating that network is for pedestrian movement. The basic calculation of a PCA is to divide the area of a quarter-mile or half-mile circle by the area of the polygon that results by traveling a quarter or half-mile from a transit stop along the street network. The figure 2 shows the study area (400 and 800 radius) at Faridabad four metro stations namely, Escorts Mujesar Metro Station, Bata Chowk Metro Station, Neelam Chowk Ajronda Metro Station and Old Faridabad Metro Station.

Fig. 2: Walkability Route Plan (Radius of 400 m and 800 m around Metro Stations)

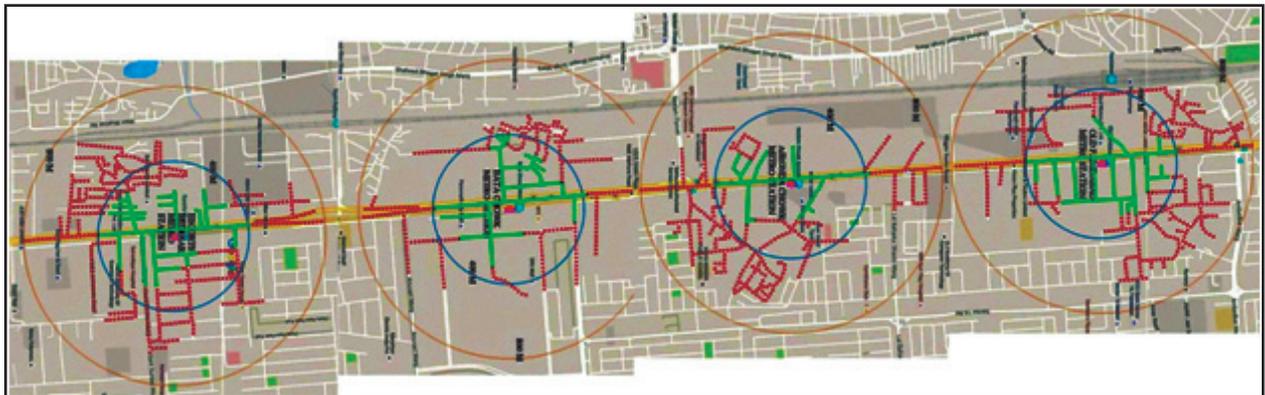
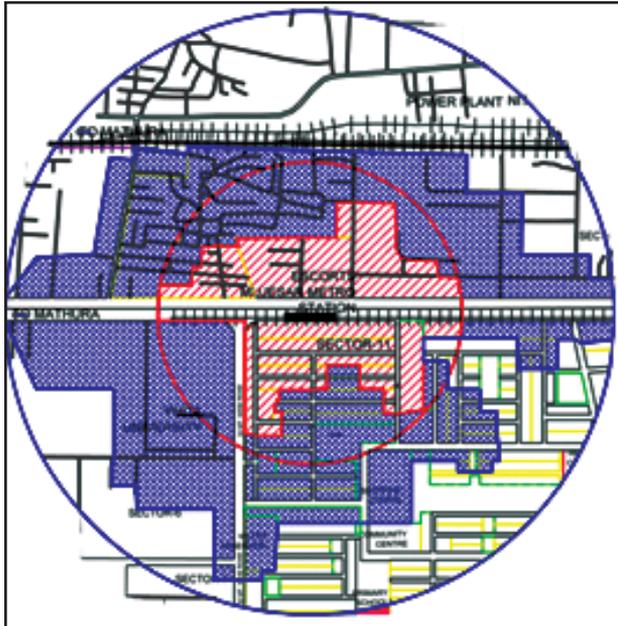


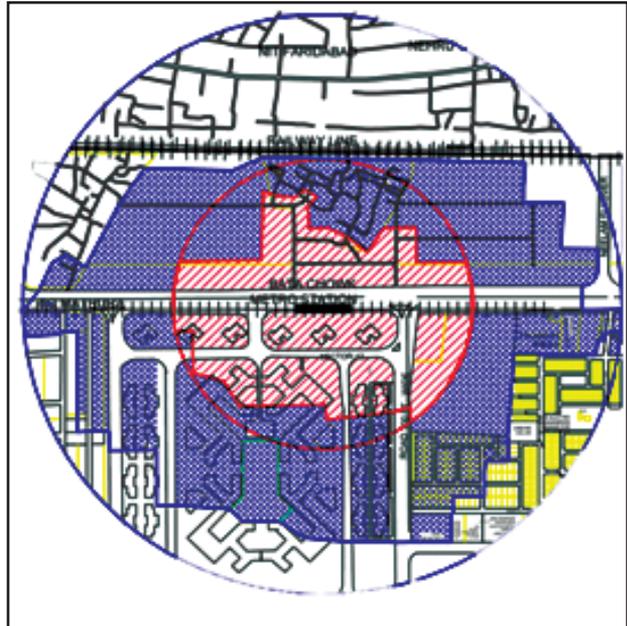


Fig. 3: Escorts Mujesar Metro Station



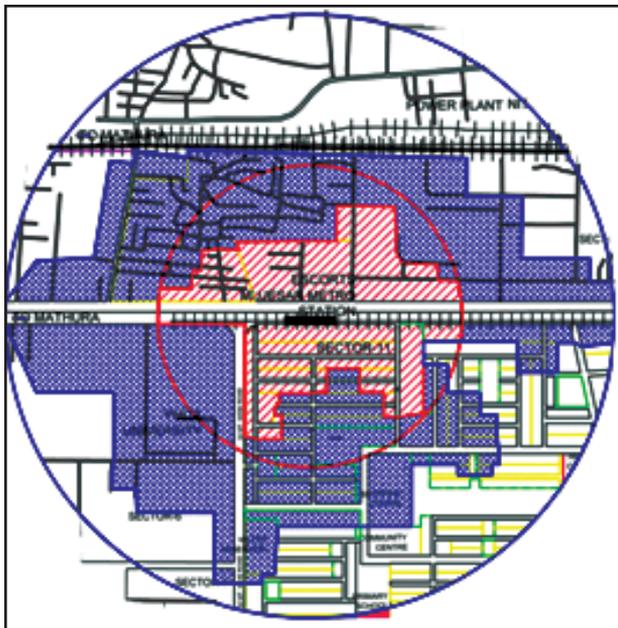
47% of the catchment area is within 400 m and 50 % of the catchment area is within 800 m walk due to well connected street system.

Fig. 4: Bata Chowk Metro Station



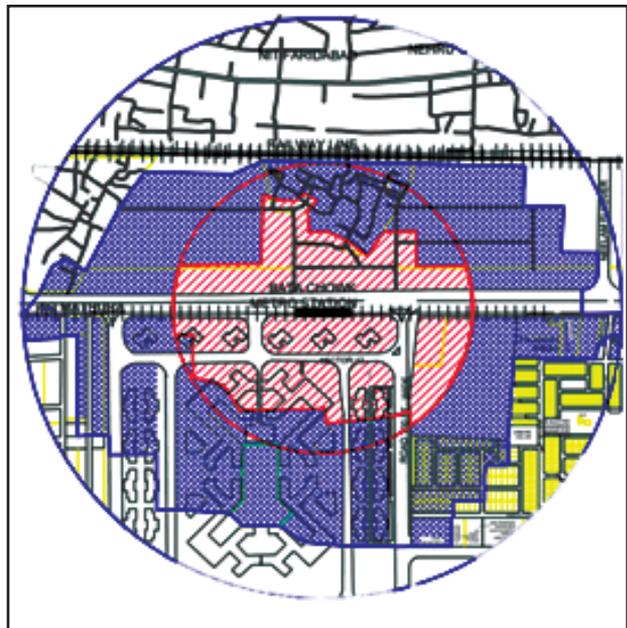
62% of the catchment area is within 400 m and 53 % of the catchment area is within 800 m walk due to well connected street system.

Fig. 5: Neelam Chowk Ajronda Metro Station



47% of the catchment area is within 400 m and 53 % of the catchment area is within 800 m walk due to well connected street system.

Fig. 6: Old Faridabad Metro Station



62% of the catchment area is within 400 m and 48 % of the catchment area is within 800 m walk due to well connected street system.

Increased connectivity (combined with increased density, mixed use planning and good urban design) = increased walkability = better health

Pedshed efficiency = $\frac{\text{Area of the actual mapped pedshed polygon (ha)}}{\text{Area theoretical maximum 400 m or 800 m radius pedshed loci (ha)}} \times 100\%$

Higher walkability is associated with a higher proportion of the maximum area. Areas with good accessibility and walkability have a pedshed access ratio of $\geq 60\%$ of an area within a five-minute walk, or a ten-minute walk to a transit station.

From the pedshed analysis, it appears that at Escorts Mujesar Metro Station and Neelam Chowk Ajronda Metro Station are grossly underutilized with 47% of the area accessible within the theoretical maximum 400 m pedshed, and all areas are underutilized with 48-53% of the area accessible within the 800 m.

The pedshed analysis suggests that each of the case study areas had potential for significant improvement in terms of the directness of the pedestrian network, and ease of access to the total pedestrian network length. This shortcoming could be rectified through the development of new roads and pedestrian links, particularly where pedestrians are forced to take unnecessarily circuitous routes to the Metro Station from their home in the pedshed areas.

7.2 Intersection Intensity Analysis

The intersection intensity measures the number of three-way or four-way intersections per unit area, capturing the grain and interconnectedness of

Fig. 7: Escorts Mujesar Metro Station



Fig. 8: Bata Chowk Metro Station





Table 3: Details of Intersections on Study Areas

Name of Metro Station	No. of Intersections @ 400 m Radius	No. of Intersections @ 800 m Radius
Escorts Mujesar	41	98
Bata Chowk	27	69
Neelam Chowk Ajronda	18	133
Old Faridabad	24	130

Fig. 9: Neelam Chowk Ajronda Metro Station

Fig. 10: Old Faridabad Metro Station

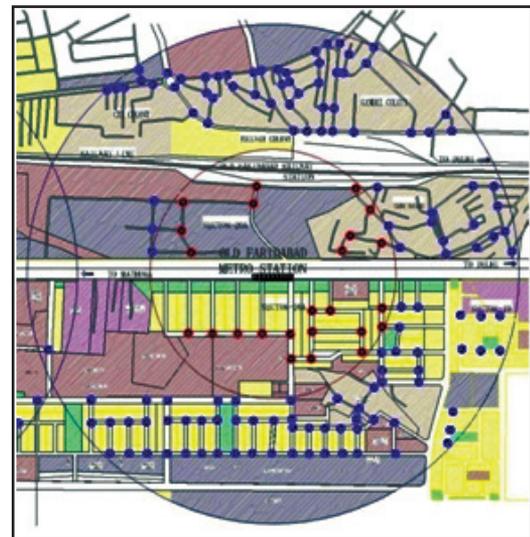
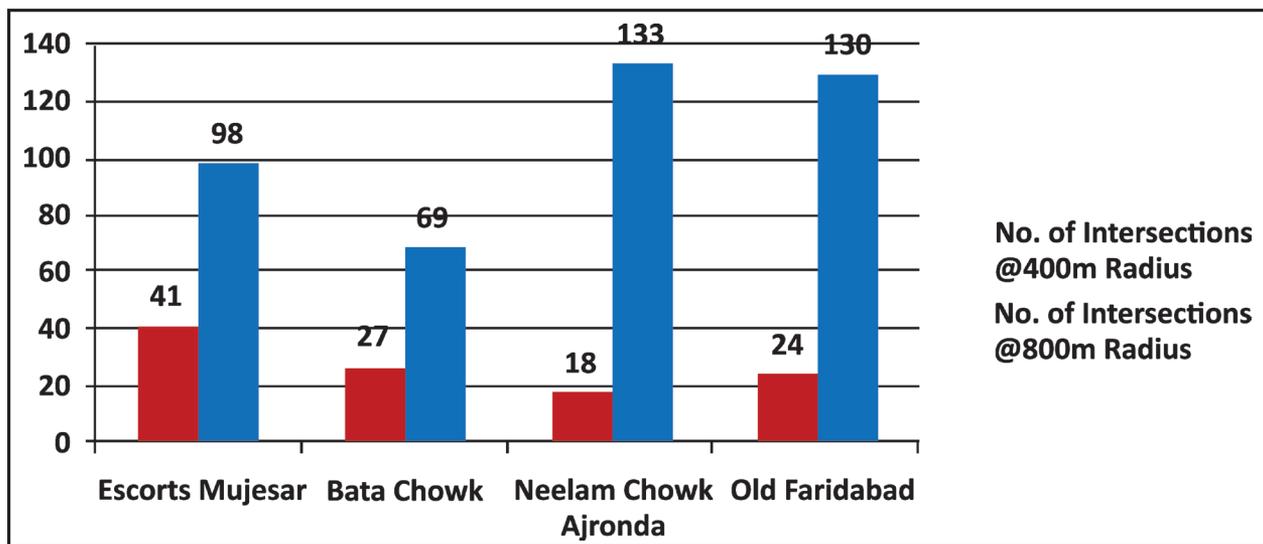


Fig. 11: Intersections on Study Areas





the street network; this is a measure of street network connectivity. This is an important measure because it represents the number of choices available to a pedestrian as they travel from the transit station to their destination. The intersection intensity analysis, in general, analyzes the concentration of intersections indicative of pedestrian choice (three and four-way) as well as the concentration of dead ends, which limit pedestrian access. In this analysis, the major arterial roads have been excluded from the neighborhood street crossing each other are considered for evaluation. The intersections that cross the major arterial roads are not recorded.

A first measure is to count the number of nodes per unit area. The higher is the number of intersections the greater is the connectivity. Railway line is running parallel to Metro Line so it creates obstruction in connecting the areas. The number of intersections within 800 meter to metro stations is of no use since the areas are not accessible due to lack of connectivity.

8. FACTORS TO INCREASE WALKABILITY

The following is a list of factors which should encourage walking on streets that are designed to be safe, attractive, friendly and efficient.

- The buildings fronting streets provide good day and night surveillance and increase personal safety;
- Good footpath design on both sides of the street for pedestrians and cyclists;
- Streets should be detailed to allow ease of at grade pedestrian crossings and normal target traffic;
- vibrant destinations...alfresco eating area, views and opportunity for “people watching”;
- Sheltered footpaths...shade trees or verandahs;
- Good pedestrian amenity, level of interest and event...places to sit along the way, active land uses, attractive building frontages, no graffiti or vandalism;
- Inviting streets...walking for leisure, to work places and daily needs shopping;
- Site responsive streets...streets that lead directly to destinations and which respect local landmarks;
- An interconnected and traffic managed street network offers a choice of alternative routes to a destination for good accessibility and visible destinations;
- good street design...traffic lights at a busy intersection, median strip, tight corner radii and on-street car parking to slow traffic, appropriate landscaping; and



- Availability of access to a transit station or bus stop.

9. BARRIERS TO WALKABILITY ON STUDY AREA

The following factors are barriers to walkability:

- The Delhi - Mathura railway line divides the areas thus, causing hindrance in the movement of pedestrian users to reach their destination and other mode of transport;
- In spite of multiple transit option the area has traffic problem, private car parking problem and lack of seamless connectivity leading to under utilized transit potential;
- Currently the land between Metro station on Mathura Road and Indian Railway line is under- utilized and acts like a land lock;
- Major Industrial areas on both side of the National Highway (sector - 5 and sector - 16) make walking trips considerably longer;
- There are long distances to destinations due to lack of connectivity in street systems;
- There is poor quality or lack of sidewalks on almost all the roads and areas;
- There is poor provision in site planning for pedestrian access to public buildings and businesses;
- The relatively low density of development in sector 12 and sector 11 means that the walking distance between housing and transit station is often long;
- There is perception of reduced personal safety on streets, particularly after dark; and
- The perception of danger from traffic on National Highway across the areas.

11. CONCLUSIONS

In many cases, a conventional street cannot be changed into a complete street overnight, but rather the result of a longer process where each element comes into place gradually and incrementally over time. There must be a vision in place so that all can see what finished product looks like and to gather and maintain support for the long-term process.

The city is required to plan for growth in response to the State of Haryana laws requiring Faridabad city to designate specific areas to accommodate growth and coordinate related planning and public investments. High-capacity metro stations generally stimulate development activity within a half mile walking distance from the station. New residential and commercial development could



be stimulated both before and after the station is built. Along a metro line there is ample amount of land is under utilized and that could be used as an opportunity to leverage transit-oriented development along in a metro corridor. Following is a list of strategies and actions, which the city of Faridabad could consider to promote walkability:

11.1 Policy and Planning

- Adopt a walkability policy for the existing and new developments;
- Plan mixed use intensification of areas of the city with the most potential;
- Prepare local area linkage plan for existing and new neighborhoods to determine where primary pedestrian routes should be located;
- Prepare a citywide master plan for pedestrian facilities by creating a hierarchy of routes and facilities; and
- Regulate new development and re-development.

11.2 Urban Design

- Develop pedestrian planning, design and maintenance guidelines to promote pedestrian mobility;
- Avoid unsafe walkways at ends of cul-de-sac and use interconnected street system instead;
- Provide access for people with disabilities to sidewalk, streets, parks and major services; and
- Reinforce neighborhood connections.

11.3 Education Activities

- Initiate activities to promote demonstration projects and increase walking.

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Development plans reflect the changes which are taking place in the country's economic and social structure as well as the directions in which the structure has to be reorganised and strengthened. In a democracy the pace of change depends to a large extent on increase in public understanding and in public response and on the growth of a scientific outlook on the part of large numbers of people. Besides the economic and social objectives, the educational aspects of planning are, therefore, of great importance.

Jawaharlal Nehru



Night Shelters in Delhi - An Overview

Ruchita Gupta

Abstract

Delhi has an estimated population of 1.5 lakh who are without access to shelter, water, and sanitation i.e., homeless. This constitutes roughly 1 per cent of the city's total population. Of the 1.5 lakh homeless 7000 are women constituting close to 5 per cent of the total homeless in the city. This number continues to swell with increasing migrant population who come to Delhi in search of jobs and dreams of better life from the neighboring states. Night Shelter is a place providing shelter to the homeless for a night with the provision of toilet and drinking water facility. To meet the minimum shelter needs of the homeless in urban areas a centrally sponsored 'Nigh Shelter Scheme for Footpath Dwellers' was initiated by the Ministry of Urban Development and Employment, Government of India during the VII Five Year plan (1985-90). The paper attempts to evaluate benefits of this central scheme with reference to Delhi.

1. INTRODUCTION

Delhi attracts large number of migrants from different parts of the country every year. As per 2001 census total population of Delhi was 138 lakh of which 53.18 lakh were migrants. In other words 38.53 percent of Delhi's population comprises of people migrating from states like Uttar Pradesh (43.56 percent), Bihar (13.87 percent), Haryana (10.26 percent), Rajasthan (5.16 percent), and Punjab (4.72 percent). Forced out of their place of origin due to abject poverty, unemployment, natural disaster or domestic problems, these people migrate to big cities in search of employment and better standards of living. Many of these migrants are confined to lower socio - economic conditions as they generally come from low income classes.

After coming to a city, the first priority for most of them is to look for a livelihood and a place to stay. Being unfamiliar to the city these migrants choose to live close to places where employment opportunities are high like bus terminus, railway stations, wholesale and retail markets, freight complexes, industrial areas, and religious centres. Being unskilled, most of them get employed in temporary jobs working on a day to day basis. They try to live closer to their work places, which not only enable them to be first in labour market to get work but also save time, money and energy in commuting long distances. As a result they either voluntarily or involuntarily tend to gravitate towards poor quality of housing, and

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sometimes into no dwelling units, i.e. on pavements, in shop doorways, in parks or under flyovers and bridges or on rickshaw or handcart which they pull during day time, or in public buildings (railway and bus stations).

Being poor they cannot afford any type of housing and live an open life with no privacy for bathing, sleeping, eating or relaxing. They do not have any enclosure to meet their simple needs of life, no space to cook, no place to keep their few possessions and without any protection against weather. The inhuman conditions in which these people are forced to live cannot be ignored. They are faced with the problem of lack of identity, conditions of extreme deprivation and neglect, climatic hardships, detrimental effects of the traffic, air and noise pollution, health and hygiene problems, police brutality, harassment and trouble from authorities, society and fellow dwellers, inhuman living conditions especially for women and children who are also exposed to sexual violence, lack of adequate basic services like water supply, toilet facilities, etc.

Far from being a burden on the city's economy, these migrants form a vast pool of cheap labour. They are employed in the 'informal sector' either as self-employed, or as manual laborers, or in the unorganized services sector. They work in para-transport sector as rickshaw and *thela* pullers transporting goods from one place to another, loading and unloading goods, as small vendors and hawkers, as rag pickers and garbage handlers. They work as laborers in small trading establishments like hotels, restaurants, small and medium manufacturing units. They also work as domestic servants. Most of these migrants are productive and provide cheap labour. Their contribution to the informal sector being immense they cannot be moved out of the city. Hence, efforts must be made to ensure provision of at least basic minimum facilities to them.

Delhi has an estimated population of 1.5 lakh who are without access to shelter, water, and sanitation i.e., homeless. This constitutes roughly 1 per cent of the city's total population. Of the 1.5 lakh homeless 7000 are women constituting close to 5 per cent of the total homeless in the city. This number continues to swell with increasing migrant population who come to Delhi in search of jobs and dreams of better life from the neighboring states. Homelessness in Delhi as a phenomenon was recognized as early as in 1960's, yet not much has been done till date.

In Delhi, around 65 percent of the homeless are concentrated in and around the Old City including the Walled City; North and Central Zones of Delhi (Fig. 1 and 2). The main reason for such high concentration in these areas of the city is due

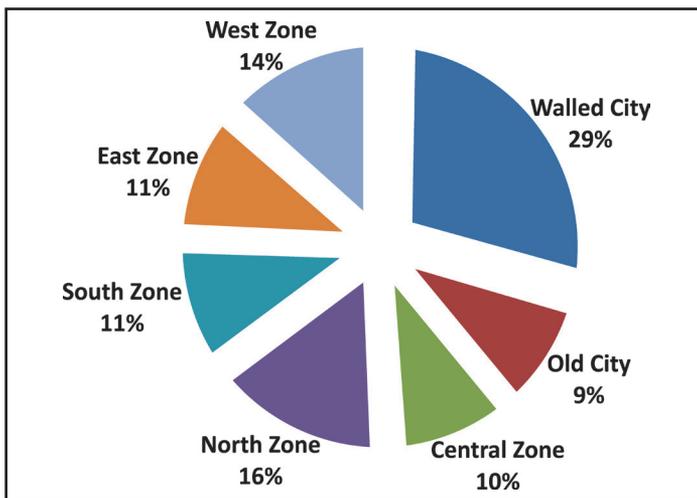
Fig: 1: Homeless in Delhi



Source: Ashriya Adhikar Abhiyan (AAA), Action Aid Programme, 2001.

to the presence of major wholesale and retail markets, railway station, freight complexes, and inter-state bus terminal which provide ample employment opportunities to this unskilled migrant workforce. Given the pathetic condition of homeless living in extreme climatic hardship and some of them even dying due to extreme cold conditions intervention by the government in the form of night shelters for these homeless at various locations in the city where their concentration is high is urgently needed.

Fig: 2: Locational Distribution of Homeless (%) in Delhi





2. NIGHT SHELTERS IN DELHI

Night Shelter is a place providing shelter to the homeless for a night with the provision of toilet and drinking water facility. To meet the minimum shelter needs of the homeless in urban areas a centrally sponsored 'Nigh Shelter Scheme for Footpath Dwellers' was initiated by the Ministry of Urban Development and Employment during the VII Five Year plan (1985-90) with the provision of minimum level of sanitary, water supply and other facilities to the inmates. The scheme was modified in August 1992 to cover all urban centers having concentration of footpath dwellers / homeless and renamed as 'Scheme for Shelter and Sanitation Facilities for Footpath Dwellers'. In October 2002 the scheme was renamed as 'Night Shelter for Urban Shelterless'. However, since April 2005 it has been discontinued.

Delhi Government never availed the benefits of this central scheme and relied on its own funds for the construction and management of night shelters in the city. The Slum and JJ Department of Delhi Government is implementing an approved Plan Scheme 'Construction, Management and Control of Night Shelters' for which the funds are being provided on year to year basis by the Delhi Government. An amount of Rs. 60 lakh has been approved for the above scheme for the year 2008-09. Based on the 2001 census of houseless population the Delhi Master Plan 2021 envisages at least 25 new sites to be earmarked for night shelters. Though, as per the planning standards of Master Plan 2021 for every 1 lakh population there should be provision of 1 night shelter which seems quite unrealistic.

Till January 2000 there were 19 night shelters at various locations in Delhi catering to 4537 persons. However, in April 2001, 6 night shelters were shut down and only 13 were in operation with a capacity of 2205 persons. At present i.e., in 2008-09 the Slum and JJ Department is running 12 Permanent Night Shelters at various locations across the city. In addition 5 Community Halls in the walled city has been converted into Night shelters to provide shelter facilities to the homeless. Besides these 10 temporary night shelters are also in operation in the community hall buildings during the winter season (upto 31 March 2009). Thus, in totality currently 27 night shelters both permanent and temporary are in operation in Delhi of which only 10 are run by the Slum and JJ department of MCD while the remaining 17 are run and managed by different NGOs (Table 1). These night shelters together provide accommodation to about 4230 people of which 160 are women/children thereby meeting the requirements of only 2.82 percent of the 1.5 lakh homeless people at present living in the city. During winter months the government has made provision for



Table 1: List of Night Shelters in Delhi

S. No.	Name of Night Shelter	Location	Capacity	Run by
A	Permanent Night Shelter			
1	Delhi Gate	Walled City Zone	80	Slum Department
2	Katra Maula Basksh	North Zone	250	Slum Department
3	Nizamuddin	South Zone	100+20	Slum Department
4	G.T Road Shahadra	East Zone	40	Slum Department
5	Jahangir Puri Sarai Peepal thala	North Zone	100	Slum Department
6	Shehzada Bagh	West Zone	150+20	Slum Department
7	S.P.M Market Rani Jhansi Road	Old City Zone	60+20	Slum Department
8	Lahori Gate	Walled City Zone	250	Slum Department
9	Raja Garden	West Zone	100	Slum Department
10	Mongol Puri	North Zone	100	Slum Department
11	Fatehpuri (Railway Station)	Walled City Zone	400+100	Aashray Adhikar Abhiyan (AAA) NGO
12	Chandni Chowk	Walled City Zone	200	NGO-AAA
B	Permanent Night Shelter (CommunityHall)			
13	Prop. No. 10615 Jhandewala Road	Old City Zone	60	NGO-AAA
14	Prop. No. 10788-89 Jhandewala Road	Old City Zone	60	NGO-AAA
15	Prop. No. 160 Gali Ravi Das	East Zone	70	NGO-AAA
16	Gali Tel Mill Wali Katra Karim	Walled City Zone	70	NGO-AAA
C	Porta Cabin Night Shelter			
17	Nand Nagri	North Zone	70	NGO-AAA
D	Temporary Night Shelters which are being managed during winter (i.e. upto 31.03.2009)			
18	Rangshala, (open air theater building) kabir basti, Malka Kanj	North Zone	200	NGO-AAA
19	1 st Floor Community Centre Sarai Phoos		100	NGO-AAA
20	Phool Mandi Building , Mori Gate	Old City Zone	400	NGO-AAA
21	C/C Kuchcha Moihteer khan, Mori Gate.	Old City Zone	50	NGO-AAA
22	C/C Hanuman Mandir, Yamuna Bazaar	Old City Zone	150	NGO-AAA
23	C/C Ganda Nala Bazaar Kashmere Gate	Old City Zone	200	NGO-AAA
24	Community Hall, Property No. 2145/XIII, Gali Ravi Dass, Teli Wara	East Zone	60	NGO-Shahri Adhikar Manch
25	Community hall, Property No. 1546-51/VIII, Gali Boriyan, Arya Samaj Gali, Ajmeri Gate.	Walled City Zone	100	NGO-DAS Foundation
26	Community hall, Chabi Ganj, Kashmere Gate, Delhi.	Old City Zone	120	NGO-DAS Foundation
27	Community Hall, Kotla Mubarak Pur near Babu Park.	South Zone	100	NGO-DAS Foundation
Total			4230	

Source: Slum and JJ Department, Municipal Corporation of Delhi, 2008-09.

additional 20 temporary night shelters in makeshift tents at different locations in the city.

These night shelters are operational between 7.00 PM to 7 AM and only 2 night shelters at Chandni Chowk and Fatehpuri function 24 hours a day. The entry fee in all night shelters is Rs. 6 per head per night except during winters when it is free. Women and children are not charged any fee. The facilities in the night shelter include provision of blankets, *durries*, jute mats to all inmates. These shelters are also equipped with basic amenities like toilets and drinking water facilities. All night shelters also have colour television sets for the inmates (Fig 3).

Fig: 3: Night Shelters in Delhi





3. PRESENT CONDITION OF NIGHT SHELTERS

A survey of the condition of present night shelters in the city reveal that their occupancy is almost half their capacity during the summer months and increases to about 80-90 percent during winter and rainy season. The main reason for such low occupancy is the poor maintenance of these structures. These night shelters are dirty, stinky and are in very unhygienic condition. The maintenance of the existing structure and facilities is very poor. Many respondents have complained that the blankets provided to them are very old, dirty and are not cleaned. The mats on which people sleep are torn, dirty and insufficient.

The people using the night shelters are not satisfied with the facilities which are provided in these night shelters. Though, toilet facilities are there but at times there is no water in the toilets and many a times these are not even cleaned. They have also complained of inadequate number of toilets in these night shelters. There is no bathing facility in the night shelters. The facilities provided differ across night shelters, for example, television sets, water coolers, desert coolers are not present in many of the night shelters. Space standards are not followed and people are forced to sleep very close to each other on the floor making them highly vulnerable to communicable diseases.

There is no proper security in these night shelters and the people using these shelters feel insecure due to frequent thefts. Most of these night shelters have no facilities like cloak room, cooking area, entertainment and health care facilities. There is no night shelter exclusively for women who need more of privacy and security. The respondents feel that the living conditions in the existing night shelters in Delhi is not conducive and efforts must be made to provide optimum level of basic amenities and improve the living environment of these night shelters.

4. REASONS FOR LOW OCCUPANCY OF NIGHT SHELTERS

In order to understand the reasons for low occupancy of the night shelters in Delhi a survey of 306 homeless people in Delhi was conducted in 2001. The results of the survey revealed that 10 percent of them were not aware of the existence of any night shelter facility in Delhi. Around 28 percent of the respondents did not like the environment of the night shelters. They find them dirty, unhygienic and claustrophobic. Moreover they also feel insecure in the night shelters due to frequent thefts by fellow dwellers who often steal their belongings and money. 26 percent of the respondents reported having no access to night shelters as these



are located very far from their work place. 16 percent said that the charges of using a night shelter is too high for them to afford, while 10 percent were not happy with the facilities provided in the night shelters. 7 percent of the surveyed people prefer to use night shelters only during the winter and rainy season. 2 percent of the respondents prefer not to use night shelters and sleep outside because of security of their rickshaw, handcart, *rehris* or *paanikitanki* which is not only their source of livelihood but also their home as there is no parking facilities in these night shelters, while the remaining 1 percent find these shelters useless because family is not allowed.

Moreover, the night shelters are open from 7 PM till 7 AM and no one is allowed inside after 12 midnight. During day time it is closed and no one is allowed to stay continuously for more than 20 days. As a result people prefer staying outside on pavements. Social groupings among homeless make them feel more secure staying in groups on pavement. In night shelters people also have fear of police as at times police raid such places to pick up their monthly quota of arrests as a crime solving measure. At times, people find the attitude of the management very offensive as a result they avoid using them. From the response of the targeted group it appears that the night shelters in Delhi, though essential from the point of view of planning, have not served their purpose which is to provide shelter to the homeless.

5. INTERVENTIONS FOR IMPROVING NIGHT SHELTERS

At present, the Slum and JJ Department of Delhi Government is running 12 permanent and 15 temporary night shelters at different prime locations in the city catering to 4230 homeless, whereas the need is for many more such night shelters at different locations in the city. The need is more in areas like Narela, Bhawana, and Khanjhawala where new industrial estates are proposed or in areas like Loni, Rohini, Dwarka and Narela sub city where wholesale markets are proposed to be developed as per the Master Plan of Delhi 2021. There is also need for temporary night shelters near major construction sites in the city like near Metro rail and flyover construction sites. Additionally, there is a need to strengthen the existing night shelters by increasing their capacity by adding additional floors as per the development controls and increasing their occupancy by making suitable changes in their design and improving the facilities.

In view of shortage of space in crowded locations like Sadar bazaar where the need for night shelters is maximum one can explore the possibility of converting existing public buildings which are utilized only during daytime and are vacant at

Fig: 4: A Prototype Night Shelter



night into night shelters. Of course, adequate attention will have to be given to ensure cleanliness and avoid inconvenience to the regular users of the building. Possibility of opening night shelters either on a permanent or temporary basis in various community halls or *Baraat Ghars* should be actively considered as these buildings are for most of the time not used except during some function or wedding season.

In order to make the night shelter scheme self sustaining commercial activities at the ground floor and godowns / parking facilities in the basement of the night shelters can be provided. The night shelter scheme should be made an economic activity and not a social overhead. Additionally as most of the night shelters in the city are located in prime locations, one may also consider the possibility of renting out their outer wall space to companies for advertisement purposes thereby generating resources to meet the operation and maintenance costs of these night shelters.

Night shelter across the city can have a prototype (Fig. 4) elevation with identical color and monograms so that they can be easily identified by one and all from a distance. The entrance should be welcoming. There should be provision of parking for rickshaws, handcarts (or *rehries*), etc.; which are the means of livelihood of many potential users. Different models of night shelters can be built as per the needs and affordability of the user group. Space standards should be worked out on the basis of which night shelters should be constructed. Layout planning, provision of basic amenities, formulation of shape and size should be



based on realistic and socially acceptable standards. Even if an existing structure is converted into a night shelter it should adhere to space standards of night shelter and should be well ventilated.

They should be open round the clock throughout the year. All night shelters should have separate spaces for women and should be disabled friendly. They should have provision for basic services including safe drinking water, clean and adequate toilets, separate bathing and washing facilities. There should be a separate store room to keep blankets, *durries* and jute mats. Night shelters should also have cloak room facility to enable the users to safely keep their belongings.

6. CONCLUSIONS

Night shelters should be designed on the concept of provision of integrated facilities like storage, common room facility, night clinic and first aid facility, canteen, vocational training, banking system, entertainment facilities, etc. Some of these additional facilities can be provided on pay and use basis. Possible interventions envisaged above to make night shelters more effective and successful, collective efforts by the various government organizations (like erstwhile Slum and JJ department, MCD, NDMC, DDA, Delhi Police), NGOs, private organizations and charitable and religious trusts is essential.

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What I should like in regard to every city is a clear plan of what the city will be like, say, twenty or thirty years later, and then you can work by that plan slowly, gradually. Nothing should be allowed to come in the way of that plan, as has happened, for example, in our city of Delhi. Amazing structures have been put up in a haphazard manner all over Delhi and they come in our way now and in future.

Jawaharlal Nehru



Generational Shift in Construction using Inter-Locking Bricks in a PPP based Model

Madhur Kukreja and Pulkit Singal

Abstract

More than 20 percent of India's urban population is living in slums. Popular cities such as Mumbai has more than half of its population living in slums or other unauthorized tenements. Unless suitable technologies and policies aimed at providing affordable housing are adopted, the situation might even get worse. Using inter-locking bricks can bring radical improvements in the construction parameters - time, cost, ease of construction and flexibility in design. These specially designed bricks have protruding tops and depressions at bottom. Stacking them on one-another creates locking mechanisms. This technology, coupled with vernacular building material, has the potential to bring down cost of construction, which can also be modelled on the lines of Public Private Partnership (PPP), wherein government provides the land by regularizing existing settlements and other municipal services, while private players can, through CSR initiatives fund the material and logistics cost, making the whole model environmentally sustainable.

1. INTRODUCTION

Affordable housing is a need of the hour in India. Current high focus on it is attributed to Government of India's project 'Housing for All' by 2022, which envisages *pucca* houses for all by 2022. This paper is an attempt to highlight how this vision can be achieved with interlocking bricks technology through a Public Private Partnership (PPP) Model. It can result in a win-win situation for all stakeholders, hence minimizing the implied cost and maximizing the returns.

Aim of the research is to exemplify how interlocking brick technology can solve the problem of affordable housing using the model of public private partnership. The objective is to identify the problem in the current approaches in dealing with various aspects of housing for urban poor, which constitute significant proportion of a city's population. Furthermore, it involves a detailed analysis about interlocking technique and PPP approach (Fig. 1) to produce social, economic and environmental benefits to urban community. This research uses a case study of Madrasi Colony, a three acre notified slum in the heart of Bhopal. Analysis has been done on how this approach could yield better results for local population i.e. slum dwellers.

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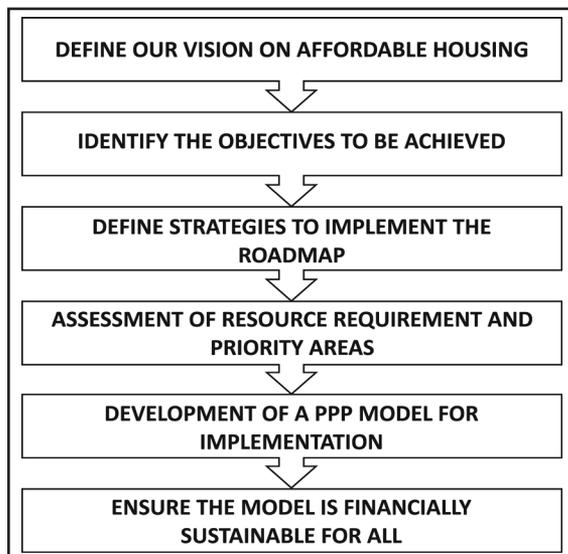


Table 1: Share of Slum Population in Major Cities of India

City	Slum Population (%)	Land Area Under Slums
Delhi	14.6	24.08
Mumbai	41.3	70.23
Bangalore	8.5	9.61
Chennai	28.5	18.10
Kolkata	29.6	19.01
Ahmedabad	4.5	3.38
Bhopal	26.7	6.47
Bhubaneswar	18.5	2.21

Housing has been a major focus in planning and policy framework of India for a long time. Various five year plans have elaborated the need to solve this issue at a large scale. However, the results have been far from successful. More than twenty percent of urban population still lives in slums. This proportion increases dramatically in major metropolitan cities. Table 1 presents the share of slum population to total population in major cities of India. Data shows that not just metropolitan cities but also Tier-I and Tier-II cities are facing housing problem involving large chunks of population still living in dilapidated and unhygienic settlements. Governments at various levels have tried on their own to solve problems through various programs and schemes aimed at improvement in their conditions. Some of these are:

Fig. 1: Developing PPP Model



- Formulation of National Urban Housing and Habitat Policy, 2007.
- Jawaharlal Nehru National Urban Renewal Mission, 2005.
- Interest Subsidy Scheme for Housing the Urban Poor.
- Affordable Housing in Partnership: Modification in JNNURM
- Setting up of a High Power Task Force on Affordable Housing.
- Launch of the Rajiv Awas Yojana, 2013.

However, failures of these approaches can be accounted for the following reasons:

- Very high cost of construction;
- Delay in implementation and execution;
- Lack of flexibility in house design;
- No community participation; and
- Little to no involvement of private entities.

2. AN ALTERNATIVE APPROACH

The solution lies in initiating a technique that will address the issues mentioned previously through an alternative approach. Interlocking brick technology

involves the use of specially molded bricks which make construction time reduce significantly cutting cost of the project to great extent. The technique enables making construction quite easy, thereby providing flexibility in house designs. The technique has to be supported by an appropriate model to involve participation of all stakeholders, especially private players so as to make project delivery faster. Government too will have to play the role of an active facilitator and regulator in this environment. Weightage of different components in total construction costs is shown in the pie chart. From Fig. 2 it is evident that brick and labour constitutes more than 40 percent of total costs.

Fig. 2: Cost Component in Construction

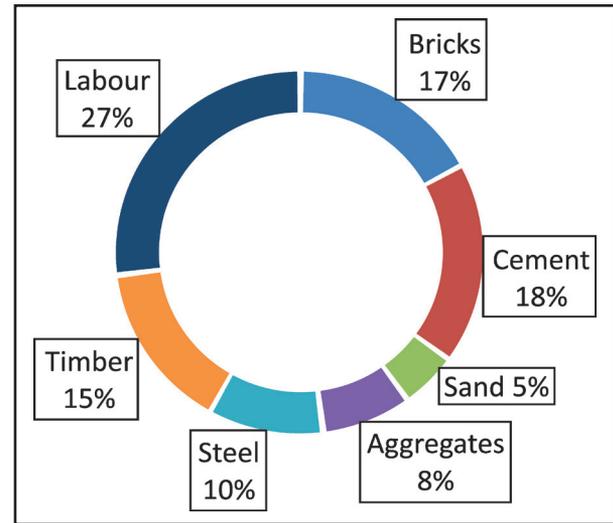
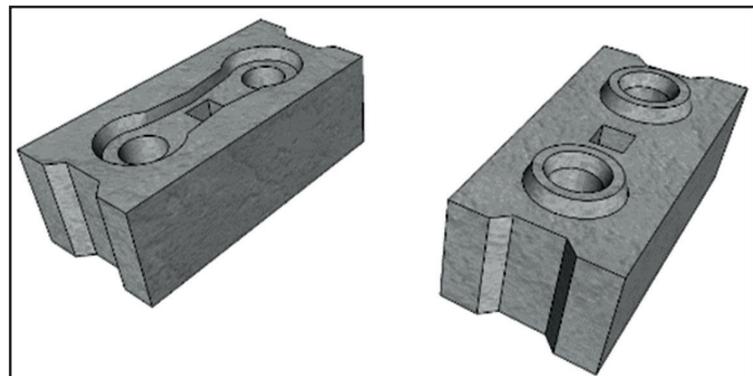


Fig. 3: Design of Inter-Locking Brick



Interlocking is a mechanism of placing two blocks adjacent to each other such that they do not move off their positions generally without using any mortar. Interlocking technology in construction is in use since 1960s, when its potential as interlocking paving blocks was utilized (Fig. 3). In the last few years, the same concept of interlocking has been applied to build precast concrete panels for general wall construction; however the technological implications for the same are relatively new and high as compared to conventional wall constructions due to which this concept of interlocking has been applied in creation of interlocking bricks. Research has proven that technology of interlocking bricks is reliable and stable. Design for houses relies on various components. In broad terms these components are:

- Cost;
- Design flexibility; and
- Time.

Costs include all the costs to be incurred in a house construction. This has got further sub-components like labour type, labour quantity as well as labour cost.



Design refers to the type of house to be built, which depends upon factors like proposed site, and proposed building use. **Time** affects the various components of construction. If the construction is completed on time or before time, it is always good. For an affordable housing project, the above components are to be modified so as they can fulfil the objective of affordability. Requirements for affordable housing projects in terms of the design components mentioned are:

- The price for such houses should be cheap so that any poor currently living in slum areas can easily buy or lease properties;
- These should be completed within a short and given time frame so to save on further cost escalations; and
- Design of such houses should be such that they are easy to build and require less amount of skilled labour.

Keeping factors of affordable housing project in view, a comparison was made between two types of structures as well as between two different methods of construction to arrive at the best possible solution (Table 2 and 3). Load-bearing method of construction is suitable for fast construction as well as conventional masonry can be used. Thus these two techniques will help in putting more number of semi-skilled and unskilled laborers to work.

Preference is being made to employ more semi-skilled and unskilled laborers because of the fact that this practice will help cut total expenditure on labour

Table 2: Method of Construction

	Pre-fabricated concrete panels	Conventional Construction (Masonry)
Cost	Depends on the scale of construction and design of panels	Depends upon the material used and availability of the material
Design	Homogeneity exists	Design can be as per individual choices
Time	Less time required	Relatively more time consuming

Table 3: Type of Structure

	Load-Bearing Wall Construction	Framed Construction
Cost	Cheap, semi-skilled, unskilled labour can be used	Costly due to usage of concrete and skilled labour
Design	Strength of the structure can be at par with framed structure, easy to construct	Higher strength, slightly difficult to construct, aesthetics might be affected due to columns and beams
Time	Less time consuming	Time consuming till columns are constructed



to some extent. Moreover it will generate employment for such persons who lack skills. Choosing conventional methods of construction pose one major problem of brick laying. Conventional bricks require skilled workers due to stacking bricks along with mortar and for clean joints. To avoid the use of mortar and thereafter alignment of bricks, interlocking bricks were designed, designs for which vary among different places and depend upon uses. Hence, interlocking bricks suited best for our case, where employment of unskilled and semi-skilled labour is more. The main criteria we chose while designing a brick are:

- Ease of stacking and construction;
- Less usage of mortar;
- Economic feasibility;
- Comparable overall strength as that of framed structure; and
- Ease of making bricks.

Making interlocking bricks is a task of precision due to small dimensions of various protruding heights as well as depressions; therefore focus is set to make such design which does not require high precision. Researching on current designs used in various countries, a brick design is made. Two different types of bricks have been designed, one for the general wall construction, the other one for foundation of a walled structure. Both are similar in all dimensions except that the brick to be used for foundation purposes has deeper cavity than the other brick, which is designed to fill in mortar. The cavity is 40 mm deeper than the other brick.

The plan as well as elevation of header (for normal brick, and foundation brick) is shown in Fig. 5 and Fig. 6, along with the dimensions. Plan remains the same for both the bricks (Fig. 4). Dimensions for the bricks fulfil the minimum requirements set by the IS Code. The depression as well as protruding height in the brick can be set between 10 mm to 15 mm. In the designs shown, the highest dimensions of the brick (that is, total length, width, height) are slightly more than what has been specified in IS 2212 (1991), and the steel rebar follows the IS 431:1 (1982).

Design of brick has two different types of holes. The square hole is designed for providing strength to the wall; rebar is put into the square hole along with very thin mortar. The circular hole is made of higher dimensions, which have various benefits such as in providing thermal insulation, to put wire / plumbing conduits, to put mortar in case of low strength walls. These holes can be modified according to the ease of making bricks which depends upon the availability of

Fig. 4: Inter - Locking Brick

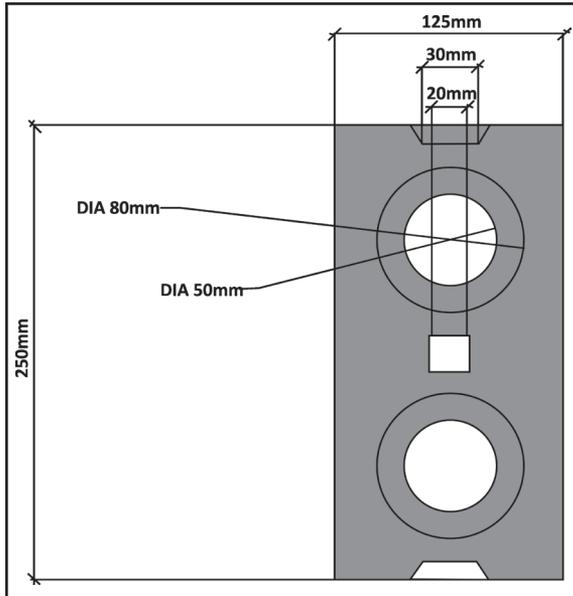
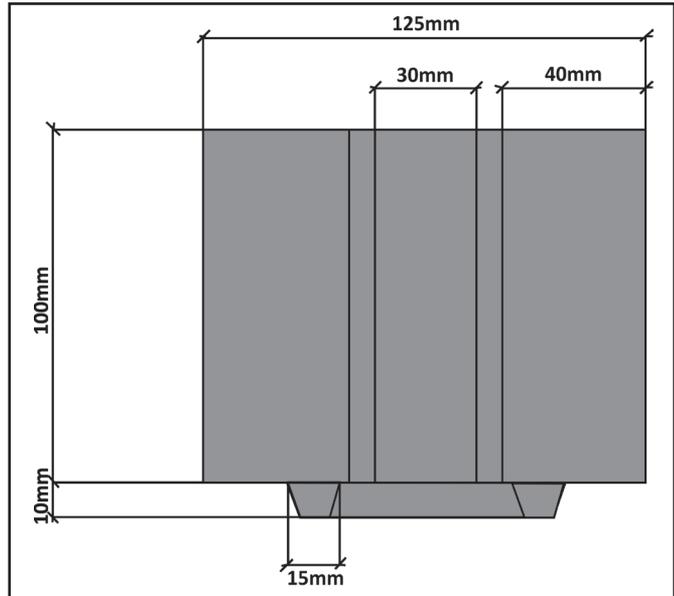
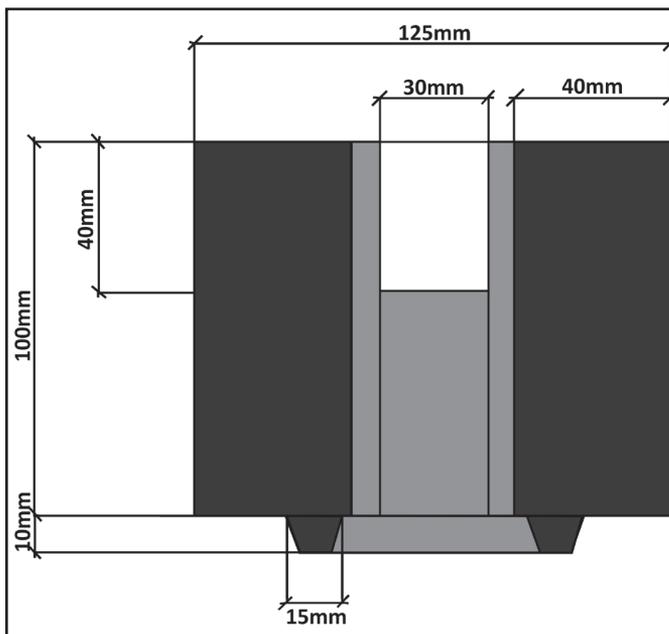


Fig. 5: Normal Brick



mold. The dimensions of the bricks can be changed depending upon strength analysis of proposed structure, and any other changes in design of the brick can be done accordingly. The distance between two continuous steel rebar as well as the grade of various materials (such as steel rebar, concrete mix, and bricks) is specified by the Project engineer.

Fig. 6: Foundation Brick



These bricks are compressed stabilized bricks (CSB). This is a technique of making bricks by compression techniques, whereby a pressure of about 3,000 Pascal is applied to the mold containing sand mix for brick. One such compressing machine can produce around 10,000 bricks in a day provided materials are supplied at a constant speed. This helps for making bricks on site, further reducing transportation costs.

Strength of such wall with interlocking stabilized bricks has been well researched, and the conclusions have been drawn that this technology is good for low rise buildings only if materials and designs of the brick meet the

minimum set requirements by BS code (or IS code). Table 4, a comparison between different materials for brick has been done and it is preferred that fly ash bricks should be used for making bricks. Though material can be changed according to the place.

Table 4: Comparison of Bricks

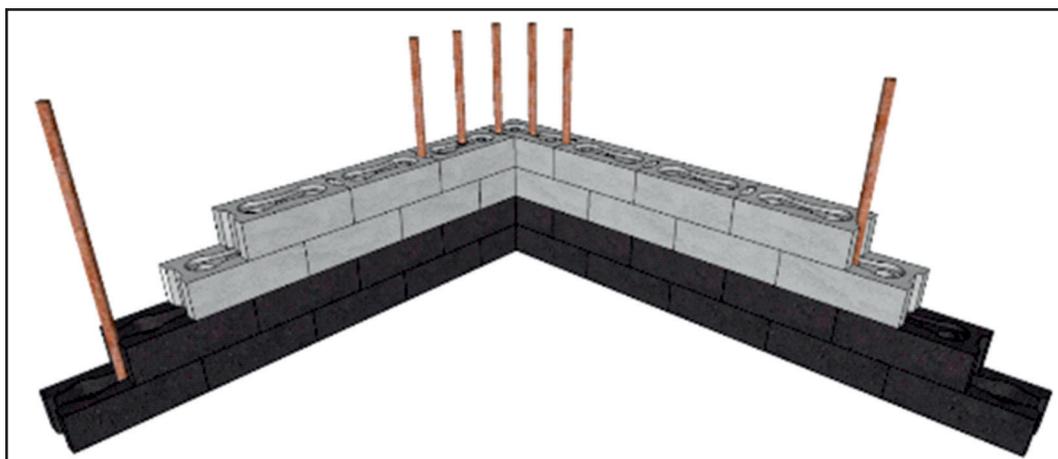
Parameters	Sand / Clay	Fly- Ash	Rice Husk Ash
Strength (kg/cm ²)	30-35	100-120	20-40
Weight (kg)	3.3	3 - 3.2	1.6 - 2
Water Absorption	15-25%	15-20%	15-20%
Shape/ Size (mm)	230 X 110 X 76	230 X 110 X 70	230 X 110 X 71
Cost (INR)	1.4	1.1	3.5
Production Location	Kiln Required	Kiln Not Required	
PLASTERING	Thickness varies on the sides of wall	Even on both sides	Even on both sides

The construction of the structure starts with laying the foundation of the superstructure. This is the foundation for keeping bricks in place as base layer. There are at least two layers of brick work. After laying the foundation, steel / iron rebar are put at appropriate locations (preferably, at corners, joints, open areas), and thereafter, the stacking of bricks. Similar to base layer, a layer of bricks is laid at the top of the wall so that it provides stability to mortar less wall.

Black bricks are the base bricks, and rods are steel rebar (Fig. 7) of appropriate dimensions. Walls made using mortar less technology as well as with interlocking stabilized bricks (ISB) saves about 20-30 percent on costs when compared to walls constructed using conventional methods. This can be attributed to following factors:

- Volume of one ISB is 15-20 percent less than conventional brick of same dimensions, thus saving on the costs.

Fig. 7: Isometric View of Building





- Time taken to make one brick is almost instant helping in making more number of bricks in the same time as compared to 3-4 days, which it takes for conventional bricks (fly ash, sun baked).
- Area required to bake or dry bricks is also saved as bricks are formed instantly.
- Labour required to make walls from ISB requires less skill, so it saves on higher costs to employ more skilled labour.

3. PUBLIC PRIVATE PARTNERSHIP (PPP) MODEL

Soliciting funds is one of the key issues to make proposed plan work. Structuring of fund provision has been envisioned through public private partnership. This is a little different from the present approaches whereby government is responsible for 100 percent allocation of funds and even the infrastructure. This model envisages the role of government to that of facilitator and regulator. Under facilitation, government should do the following:

- Free land banks available in city core to be used for affordable housing for slum dwellers. The amount of land available and unused with state governments in various cities of India (Table 5).
- This clearly shows that most of the slums and squatters are located on government lands and other vulnerable land patches. The issue of safety too can be solved with proper intent.
- Urban local bodies must provide basic infrastructure facilities like water supply, sewerage, electricity and solid waste free or at a very subsidized cost.

The issue is whether it would be economically viable to do so or it would just be a populist move. Research has proved that healthy living environment, better quality of life, stability in income and land tenure enhances productivity

Table 5: Land Ownership with state governments

City	State Government Land Ownership lying vacant (%)	Land Area Under Slums (in sq. km)
Delhi	10	24.08
Mumbai	12	70.23
Bangalore	17	9.61
Chennai	20	18.10
Kolkata	19	19.01
Ahmedabad	11	3.38
Bhopal	8	6.47
Bhubaneswar	21	2.21

of the population thereby contributing to the country's economy. A very direct relationship of this kind would be made when education opportunities also become available for children with the provision of electricity. Therefore, providing slum population access to urban infrastructure at a subsidized cost is not a liability but an investment as their uplift will allow for monetization in the future.

India requires US \$1 trillion investment in infrastructure over the next decade, with a

lion's share of it being required specifically for housing and allied sectors. Providing such large sums by the government seems a difficult task. The sheer size of investments required and the ability of government to fund it can be ascertained from the fact that India's foreign exchange reserves stand at US \$338 billion. This is a little under 40 percent of the amount we require to fund urban infrastructure in our cities. Fig. 8 shows the role of various stakeholders in this model. Thus, private investment is necessity and the skills of private sector such as faster execution, time punctuality, and quality needs to be capitalized for the benefit of local communities. The research envisages the role of private sector as provider of construction material. This can be done in the following ways:

Fig. 8: Role of Various Parties



- Since the technique involves creation of G+1 structures, allowing private sector to sell the first floor in open market, is possible;
- Private entities engaged in such an endeavour shall get additional FAR on any other area where they would do construction; and
- Ground floor of houses could be given to beneficiaries at a subsidized cost and shall be given on lease for a period of 21 years after which the ownership shall be transferred to the private player who has constructed these units. This shall ensure that private player shall maintain the place too in the long run.

Benefit to each stakeholder from this endeavour could be enormous as listed below:

For Government

- Better quality of life and good lifestyle for citizens, and giving them facilities ensures that this population can become middle class in the future, thus contributing to the economic growth of the city as well as higher tax collection, and
- City becomes clean and free from uninhabitable settlements, creating a positive image that can promote other economic activities.



For Private entities

- Selling an additional floor in open market will bring them risk-free revenue and compensate for subsidized housing for slum dwellers;
- Additional FAR will be another attractive proposition; and
- After 21 years, they would get the ownership of houses, creating an asset for the future.

For slum dwellers

- Quality homes at affordable cost;
- Location of houses within the city;
- Flexibility in house design; and
- Provision of infrastructure facilities: water supply, sewerage and electricity by the Municipality.

For city residents

- Creating a slum- free urban environment; and
- Better quality of life for all the citizens.

Table 6: Comparison of Two Programs

Stakeholder	Current BSUP Program		PPP Program	
	Relative	Absolute	Relative	Absolute
Slum Dweller	15%	Rs. 80,000	15%	Rs. 50,000
Private Player	No Involvement		70%	Rs. 2.91 Lakh
Government	85 %	Rs. 4.5 Lakh	15%	Rs. 50, 000

Table 7: Characteristics of Madrasi Colony

Location	Ward No.49, Bhopal
Area	3 acre
Population	1546 (806 Male and 740 Female)
Land Ownership	Bhopal Municipal Corporation
BSUP Implementation Agency	Bhopal Municipal Corporation
Number of Households	391
Average Household Size	5.8
Religious Background	65% Hindus and 35% Muslim
Community Profile	Mix of Tamils, Marathi's and locals
Dwelling Unit Size	27 sq. meter

Currently, a 30 sq m house under BSUP program takes anywhere between Rs. 4 - 5 lakhs to build (includes only construction cost). Out of this, 20 percent cost is borne by slum dwellers. Land Cost in Bhopal = Rs. 50, 000 {40 Sq. m. (25 sq. m. + Circulation Area)}. Construction cost will be between 2- 3 lakhs (since Interlocking technology is 20-30 percent cheaper). Thus, it can create a win- win situation for all stakeholders involved in creating a workable and implementable solution to the problem of slums.

4. A CASE STUDY OF MADRASII COLONY, A SLUM IN BHOPAL

To substantiate our findings, a case study was conducted in Madrasii Colony of Bhopal. It is one of the major slum areas in the city. Salient features about the slum are given in Table 7. Notified in 1984, Madrasii Colony is located in the core city area of Bhopal city where monthly average household income is Rs. 4,000; monthly average household expenditure: Rs. 2,500; and comprises largely Tamil workers who work as stone cutters and construction laborers. The location of major slum areas in Bhopal, highlighted in red is the Madrasii Colony (Fig. 9).

4.1 Main occupation of workers

Distribution of different workers based on occupation – unemployed was 69 percent, employed in unorganized sector 13 percent, salaried and self-employed 14 percent and retired 4 percent (Fig. 10).

4.2 Housing provided to the Slum Dwellers and Beneficiary contribution

Planned house cost per dwelling unit was Rs 1, 00, 000. But due to increase in construction period, the cost of construction also increased. So, the actual house cost = Rs. 2, 56, 000. Total amount to be paid = Rs. 89, 000. Due to increase in construction period, it was evident from the calculations that the project cost saw an escalation of 16.4 percent per house.

4.3 People’s Satisfaction and Perception to BSUP Program

- 65 percent of the people didn’t like the construction quality.
- 45 percent of the people felt the area of the house was too small. Average family size was 5.7.

Fig. 9: Location Map of Madrasii Colony

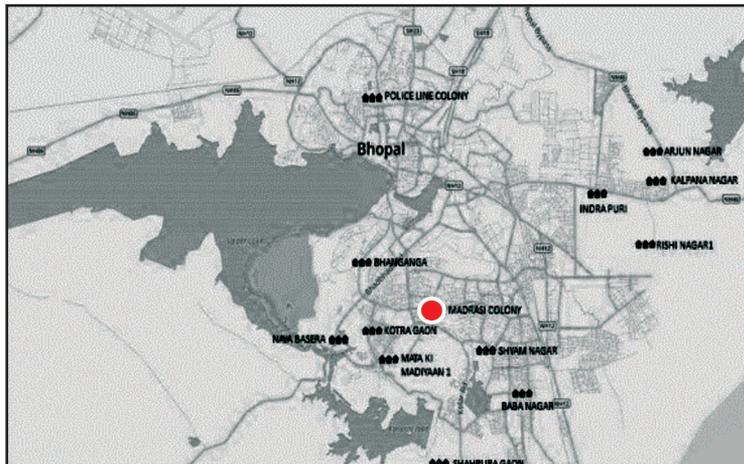
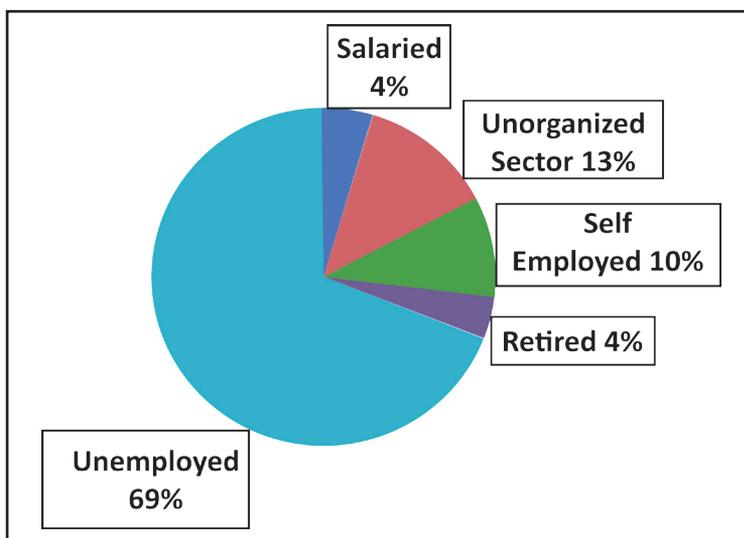


Fig. 10: Distribution of Workers





- Almost all the people complained of lack of adequate provision of physical infrastructure and social infrastructure in the vicinity.

5. CONCLUSIONS

PPP model using interlocking bricks can be a viable solution because it involves no project cost over-runs; has very limited contribution by government for this purpose entailing its role as a facilitator and regulator; flexibility in house designs for slum dwellers; and house location within a city, thereby creating a better lifestyle. This paper clearly shows that interlocking bricks are a better alternative than the traditional construction technology as it provides speedy construction time; flexibility in house design; and lower costs than traditional technology. Public Private Partnerships can create a sustainable model, which can produce effective results. Government needs to only spend one sixth of the project cost and its main role shifts from constructor to facilitator and regulator. Private sector's strength as efficient executor gets capitalized in the process as they provide most of the investments. Slum dwellers get dwelling units at affordable rates at a better facilities. Thus, it can be concluded that this model is implementable and workable to produce slum free cities as also creating a healthy urban environment of our cities.

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Political Participation of Women in Politics: Decreasing Trends in Odisha

Rajalaxmi Das

Abstract

This paper attempts to ascertain the participation of women in Odisha which is basically male dominated. Our tradition, culture and scriptures all pay respect to women and regard women as goddesses. But in practice women have had to be content with a subservient role within the house for centuries. There has been discrimination against women right from the birth. This is still part of our society and majority of Indian woman's life itself has been a long hurdle race both within and outside the family. Therefore, women have not found adequate representation in the Lok Sabha and the same in the State Assemblies. The idea of women's participation naturally assumes greater importance in a democratic system. Which indeed demands it? After all, participation is the principal means by which consent is granted or withdraws in a democracy and the rulers are made accountable to the world.

1. INTRODUCTION

True democracy is a system, which in Abraham Lincoln's words, is a government of the people, by the people and for the people. While most of the democracies have given a system which has a government elected by all the sections of societies, it is debatable whether the government comprises of all the diverse sections and importantly whether the government works for all the people of the democracy. In this context, the problem of low participation of women is of special concern for democracies and without changing that, true democracy can never be achieved.

2. WOMEN'S POLITICAL PARTICIPATION IN INDIAN POLITICS

India is the largest democracy in the world with a three-layer governance structure: central government, state government and city/village government. An independent body of the Election Commission, which is constituted separately at the state and central level, does the election to all these three.

The term political participation has a very wide meaning. It is not only related to right to vote but simultaneously relates to participation; decision making process, political activism, political consciousness, etc. Women in India participate in voting, run for public's offices and political parties at lower levels more than men. Political activism and voting are the strongest areas of the women's political participation. To combat gender inequality in politics, the Indian government has instituted reservations for seats in local government. In recent year women, turn

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out during parliamentary general election 2014 was not satisfactory. India ranks 20th from the bottom in terms of representation of women in parliament. Women have held the posts of president and Prime Minister in India as well as chief minister of various states. Indian voters have elected women to numerous states legislative assemblies and national parliament for many decades.

To remedy low participation of women electors, India in 1994 established quotas (reservations) in the constitutional amendment (73rd and 74th) to reserve 33% of seats in local government for women. The women's reservation bill (108th amendment) has been introduced in the national parliament to reserve 33% of Lok Sabha and Vidhan Sabha seats for women. The bill has yet to be passed by Lok Sabha and signed into law.

States such as Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Kerala, Maharashtra, Odisha, Rajasthan, Tripura and Uttarakhand have increased reservation to 50% for women at the Panchayat Level. As of 2013, it has been reported of the members of parliament 11% were women in Lok Sabha and 10.6% in Rajya Sabha.

Table 1: Measurement of Women's Participation at the Union and State Level.

State	Lok Sabha	Vidhan Sabha
Andhra Pradesh	7.00%	8.16%
Assam	14.29%	11.90%
Bihar	7.50%	14.81%
Chhattisgarh	9.09%	11.11%
Goa	0.00%	2.50%
Gujrat	15.38%	6.59%
Haryana	0.00%	10.00%
Himachal Pradesh	0.00%	4.41%
Jammu and Kashmir	16.67%	3.45%
Jharkhand	0.00%	9.88%
Karnataka	3.57%	1.33%
Kerala	5.00%	5.00%
Madhya Pradesh	17.24%	13.48%
Maharashtra	10.42%	3.82%
Odisha	9.52%	4.76%
Punjab	7.69%	11.97%
Rajasthan	4.00%	14.00%
Tamil Nadu	10.6%	7.26%
Tripura	0.00%	8.33%
Uttar Pradesh	16.25%	8.93%
Uttarakhand	20.00%	7.14%
West Bengal	28.57%	11.56%

The election commission with information on both the voter participation as well as the information on elected representatives primarily maintains all the statistics for the election. Table 1 shows the voting percentage of women in the most recent Lok Sabha, Vidhan Sabha election.

3. WOMEN'S PARTICIPATION IN STATE POLITICS LIKE ODISHA

In case of Odisha, however according to 2011 census the population was 4.19 cores. Among them male was 2.12 cores and the female was 2.07 cores. Now it was found that in India as per 2011 census in every 1000 males, there are 978 females, which is decreasing every year. In 2015 it was reduced to 924 in every 1000 males accordingly, the women's representation in Odisha Vidhan Sabha is decreasing, which is now only 11 women out of 147 assembly seats. In case of Loka Sabha the representatives are only 3 out of 21 seats and in Rajaya Sabha only 1 out of 10 seats represented for Odisha. In the



state council of ministry, there are only 2 women ministers out of 21 ministers. At the party level organization in Odisha there are only 3 women office bearers out of 31 office bearers in the BJD party organization, so also in B.J.P there are 6 women out of 24 office bearers and in congress there are 19 women out of 169 office bearers. Hence, it is generally found that the percentage of women's participation in different political parties is decreasing in comparison to males.

Table 2 shows that the lowest women ratio is 838 out of 1000 males in the Khorda District in comparison to all 30 districts of Odisha.

Again, it was also found that the women Voter have been reduced to 900 in 54 Assembly constituencies in Odisha (as per the report of Election Commission, for example, in capital city, Bhubaneswar the female participation in assembly election is only 800 out of 1000 males. If we compare the three assembly constituencies in Bhubaneswar, Bhubaneswar Ekamra, Assembly Constituency female's participation is 816 out of 1000 males, in the Bhubaneswar North Constituency, female's participation is only 766 and in Bhubaneswar central assembly constituency female is participation is 739. Generally, it shows that the female's participation is decreasing every year in Odisha.

4. SHORT COMINGS

Women in Odisha are mainly confronted with many disadvantages and it is not surprising that when women come to participate in politics these disadvantages come in their way:

- Women are used, as proxies by men in the family who are already involved in politics and the culture or tradition of our society do not encourage women to participate in politics.
- Lack of education among women has been a key constraint on their ability to discharge their duties in the political development.
- Women are deprived to expose themselves to media both print and electronic media, particularly in rural area.

Table 2: Comparison of District wise Population of Male and Female of Odisha

District	Male	Female
Khurda	1000	838
Nayagarh	1000	874
Jajpur	1000	875
Jagatsinghpur	1000	875
Kendrapara	1000	880
Cuttack	1000	882
Sonepur	1000	886
Bhadrak	1000	892
Dhenkanal	1000	896
Angul	1000	898
Puri	1000	904
Ganjam	1000	903
Bargarh	1000	905
Jharsuguda	1000	921
Balasore	1000	923
Mayurbhanj	1000	980
Malkangiri	1000	1005
Kandhamal	1000	1029
Rayagada	1000	1097
Bolangir	1000	927
Keonjhar	1000	946
Boudh	1000	950
Debagarh	1000	952
Sambalpur	1000	957
Kalahandi	1000	960
Nimapara	1000	967
Sundargarh	1000	969
Nabarangpur	1000	1004
Gajapati	1000	1025
Koraput	1000	1042



- Lack of political understanding, lack of knowledge and experience in the political system engendered a feeling of uncertainty among of female members to participate in an any activity.
- The apathetic attitude of the male members of the Odisha proved instrumental in increasing little space for women's participation.
- Poverty is the most important element which creates an obstacle to participate in the political process.

5. CONCLUSIONS

Basically the politics of Odisha is male dominated. Our tradition, culture and scriptures all pay respect to women and regard women as goddesses. But in practice women have had to be content with a subservient role within the house for centuries. There has been discrimination against women right from the birth. This is still part of our society and majority of Indian woman's life itself has been a long hurdle race both within and outside the family. Therefore, women have not found adequate representation in the Lok Sabha and the same in the State Assemblies. The idea of women's participation naturally assumes greater importance in a democratic system. Which indeed demands it? After all, participation is the principal means by which consent is granted or withdraws in a democracy and the rulers are made accountable to the world.

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Urban Complexities and It's Implications on Planning Education

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Abstract

The question as to what the cities of the future will be like. And how does contemporary planning will address dynamic process. It is being increasingly recognized that current urban planning education systems lack in effective future-oriented approach that would enable them to anticipate future transformations, effectively prepare graduates to tackle this complexity. This paper discusses importance of innovation in education and new possibilities for learning that are independent of time and place (e-learning), expanded possibilities for experiments using tailor-made models, and additional demands on graduates have led to new study programs and educational concepts. There is a strong need for a major shift in planning education for interdisciplinary approach, the way of thinking and acting about the future of cities, a shift from the traditional mind-set to a more imaginative, innovative and inclusive approach.

1. INTRODUCTION

The twenty-first century is likely to be dominated by urban living in a way those we have not experienced before (Thorns, 2002). In the year 1900 only 14 percent of people lived in urban areas. As a result of intensive urbanization processes in the 20th century the population of cities rose to 47 percent in 2000 and it is expected that in 2030 it will reach 61 percent. It is also predicted that almost all of the future population growth will take place in the urban areas, mostly in developing countries (UN, 2014).

Globalization is putting more pressure on cities and current urban systems unable to cop up with this pressure. International flows of goods, services, capital and information to the local level are known as globalization (Stren, 1993). The information revolution, preceded by the advancement of communications and transport technologies, enabled global networking based on the exchange of goods, services, information and labour. The current phase of globalization is qualitatively different in terms of its scope, speed and complexity. As urban space is a product of wider social one (Lefebvre, 1991), the process of globalization is reflected in urban life and urban paradigms.

Globalization affects urban management in both developed and developing countries. It spreads the norms of democratic governance, transparency and accountability. It also affects the physical infrastructure of the global cities.

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Globalization also creates dualistic societies and increases the gap between the 'have' and 'have nots' (Cohen, 2004). The effect of globalization on urbanisation appears to be economically dynamic but produces many problems in urban service and infrastructure delivery. Planning model of China's pro-growth oriented urban planning is generated by the rapid urbanization driven by the endogenous industrialization and exogenous globalization demonstrate that planning as a positive instrument for only economic change could achieve positive economic growth but fails to address sustainability issues.

Today, there is a new emphasis on decentralization, transparency and accountability. A more flexible, indicative and proactive type of planning is needed. Future cities need to be more consciously planned if they are to address sustainability properly. Urban planning practices also need to be changed to reflect a new awareness and to integrate environmental, health, economic and social concerns in the 21st century.

Hall and Pfeiffer (2000) narrated that "cities worldwide are increasingly networked in complex systems of global interaction and global interdependence" As a result of globalization events, decisions and actions occurring in one part of the world have important consequences for societies and individuals in other parts. This increases complexity even further and makes it even more difficult for urban planners and policy makers to understand the internal and external interdependencies of urban systems.

Urban and regional development in world is now facing unprecedented major challenges. As before, the expansion of settlement areas continues to draw on valuable cultural land, the overload from large infrastructures keeps increasing and, under tight financial conditions, the development of major transportation infrastructures can no longer keep up with the desired economic development. The question is does our planning education addresses the challenges of the development of a comprehensive approach to the spatial impact and the consequences of change in society, climate, and technology. In times of rapid change. It is necessary to get the overview and deeper insights about the state and perspectives of planning education.

2. TWENTY FIRST CENTURY CONTEMPORARY URBAN PLANNING CHALLENGES

Planning is also a science of developing analytical framework to solve biophysical, social, economic, political and institutional problems existed within a region or urban settings (van Horen, 2004). Historically, one of the main emphases of the planning education has been to foresee the future of cities and regions. In fact, planning used to be about taking decisions in the present time to steer urban and regional development so as to improve a community's future quality of life.



Many of the core skills that planners need are equally relevant in very different contexts. Planners are practical, but need vision and analytical abilities, so that they can create new, practical options for development. However, good planning requires imagination but also the skill of listening to the voices of others and working together. Unless we can nurture and apply such innovative professionalism to the urban condition we face the kind of dystopia that we only know through science fiction.

Urban Planning is essentially interdisciplinary - seen as a teaching and research specialty within interdisciplinary field of engineering, architecture, landscape architecture, social, economic and environmental planning, and typically involving teams from multiple professions. With their direct connections to tangible issues and their location within multiple professions, planner could well become exemplars of interdisciplinary work while expanding and deepening their own body of knowledge. But 21st century skills require deep understanding of subject matter. It is emphasized that gaining a deep understanding is, not surprisingly, hard. Shallow understanding requires knowing some facts. Deep understanding requires knowing the facts and knowing how they fit together, seeing the whole complex situation.

Can we get more specific in defining 21st century skills for planners? Many definitions have at their core the ability to “analyze and evaluate information, create new ideas and new knowledge from the information.” In short, the skills are not new, but they take on a new urgency in the 21st century. It also emphasizes the importance of creativity and critical thinking, but adds new knowledge to the definition. It includes global awareness, media literacy, information literacy, and other new content. Planners are always concerned about problems that people have in their communities and they also try to provide practical solutions to these problems. Planners start with a vision of what would be ideal for a community and then apply analytical, technical and socio - political skills that help in planning a better community (van Horen, 2004). Skills like “analysis” and “critical thinking” are important aspect of planning education. In this context, the RTPI has called for ‘critical thinking about space and place as the basis for action or intervention’ (RTPI 2012a: 2).

Futures, prospective, foresight, scenario planning and urban visioning are successfully being used to foster the sustainable development of prosperous cities and towns in a manner that favors a more holistic, inclusive, integrative and creative approach (Krawczyk and Ratcliffe, 2004). The high-speed and hyper-dynamic urban change requires a fast forward response (Rau, 2012) or even a forward looking response. Greater breadth of knowledge among planners is also required to plan effectively to respond adequately to the challenges our cities and towns are facing in the 21st century.



3. THE STRENGTH AND WEAKNESSES OF CURRENT PLANNING EDUCATION APPROACHES

There are two principle alternate foundations for planning study. First, a defined knowledge basket of traditional theories is communicated to the students and, second, assistance is offered in an open, critical and inspiring environment and the students learn to use their own minds in various areas of knowledge. Majority teaching occurs in first principle. In the first, teaching approach are based on a defined knowledge basket. Such a basket is based on known problems and their known and applied solutions from books of histories. Planning courses aims to build a tradition of quality in planning and resist of following innovation. Indeed, pure innovation has not guaranteed good results; it may even be argued that the worst urban areas of the 20th century resulted from “innovative” models: ordinary suburban sprawl, tower block schemes, and urban motor ways all drew their inspiration from famous, primarily theoretical models like Le Corbusier’s “Ville contemporaine”, Ebenezer Howard’s “Garden City” and Frank Lloyd Wright’s “Broadacre City”. As a result of the enlightenment, the existence of true, permanently established knowledge was denied. What had once proved true in one period could become false in current context. New knowledge could replace theories, models, methods and routines that had been deemed correct for centuries. If the study of unsolved problems is introduced to the academic program, it would bring in aspects that are difficult to teach theoretically, but are easier to learn through experience. In this respect there are three approaches are broadly suggested to teaching and learning in town planning discipline as it is taught at various schools, universities and colleges: 1) academic / theoretical, 2) studio / reflexive, and 3) professional / practical.

Academic / theoretical approach very popular among teachers and comes under first principle as mentioned above. In this type of teaching does not involve the sort of practical criticism and reflective practice. Theoretical learning dismissed as “the city of theory” by the great planning academic Sir Peter Hall (Hall, 2002). Many teachers of planning schools and colleges still following teacher centered approach the one-way method. This approach need to be changed to the concept of students-centered, interactive study.

The practical orientation of planning teaching is exemplified by many academicians. For example the RTPI, emphasis learning outcomes that students should be able to “Generate integrated and well substantiated responses to spatial planning challenges” and “Recognize the role of communication skills in the planning process and the importance of working in an inter-disciplinary context, and be able to demonstrate negotiation, mediation, advocacy and leadership skills” (RTPI, 2012: 3-4). This view itself contested by academics, many teacher recognizes as “employers ... expect students to know about everything”,



whereas our professional orientation is to provide students with the skills so they can look up the general permitted development order, or understand how to analyze a local development plan policy and put this into practice through the statutory planning decisions.

One needs to be balance teaching requirement between these two approaches of academic/theoretical and professional / practical to teaching and learning in the discipline. On one hand we need to try to give students the practical skills they will need as planners and professionals in the workplace, while providing the theoretical underpinnings so they understand where urban planning has come from. They should also understand the political nature of planning as a state activity and to critically analysis of policy problems. Teaching should not be led by any current ruling concept; rather it should allow the unsolved problems to lead the process, the small as well as the large, theoretical as well as practical. This approach yields the connection between research and education. Friedmann (1987) argued that the whole enterprise of planning was about the relation of knowledge to action. But what is encompassed by 'knowledge' and how do the spheres of 'imagining', 'knowing' and 'acting' relate to each other? The established idea in twentieth-century policy analysis and planning was that knowledge was primarily that of 'science', formalized through the routines of deductive logic and inductive inquiry from empirical evidence and experimentation.

Scientific urban planning personnel training model should be based on the quality of education, so that the knowledge, capacity and quality of the students can be developed coordinately. The students can be educated from a purely attention to strengthening its knowledge to improving both the quality of the comprehensive capacities. Nevertheless, it is equally clear that the innovations and applications of good practice have not completely addressed a number of persistent tensions: between research and practice; between core skill development and 'training'; and between traditional face-to-face and online delivery mechanisms.

4. URBAN COMPLEXITY AND CHANGING CONTEXT OF PLANNING EDUCATION

Can we realistically hope for an educational system of urban planning that will teach large numbers of students to use the new tools for thinking that complexity theory has developed? There has long been an expectation that planning education must keep pace with the shifts in planning practice and professional demands. Planners plan cities and towns within a particular context, and the context validates the particular methods they use. The context of our urban planning has been changing notably throughout this century. Cities in the 21st century will account for nearly 90 percent of global population growth, 80 percent of wealth creation, and 60 percent of total energy consumption. The process of economic globalization has had profound effects on the urban development. OECD report on Cities for the 21st century recommended transformation of



contemporary urban planning and suggest that “All that is certain about the future of cities is that they will change, rapidly, profoundly, and unpredictably. Urban planners and policy-makers face a complicated and difficult task. They will be required to make sharper choices, and, because, the future is unknown, to make decisions and design programmes based on incomplete information, in macroeconomic conditions that are likely to make resources scarce.” Urban development processes and decisions take time, and speed up suddenly. Townsend (2014: 305) argues that smart cities need new agile and fluid practices, as the reality changes constantly.

It is a global imperative to develop systems that improve the livability of cities while dramatically reducing resource consumption. The challenges for planner are to understanding the complexities of cities and to plan and design of Urban Systems for high-density cities such as systems for mobility, energy, food, and living / working. The planning and design of these systems must be resilient, scalable, and reconfigurable. Cities that employ optimization techniques have reported improvements in energy efficiency, water use, public safety, road congestion, and many other areas. Cities and urban processes have moved to the core of research agendas across several academic disciplines and interdisciplinary fields. New analytical frameworks and practical tools are needed to model, understand and manage urban transformations. The challenge in urban areas is that a city is not a ‘thing’, but an imagined phenomenon, understood differently by different people (Healey 2007: 27-27).

It is ever more being recognized that urban planners and policy-makers lack an effective future oriented approach that would enable them to anticipate future transformations, efficiently prepare for ensuing consequences and tackle the inherent complexity (Krawczyk and Ratcliffe, 2005). The emphasis is that futures new methodologies can provide a fresh, systematic, imaginative and innovative approach that would assist urban planners, decision-makers and communities in exploring possibilities and envisioning and creating their desired future. Urban systems differ from many other systems as usually no sudden error will follow the decisions, but consequences will be seen after several years, challenging the understanding of decision-consequence loop. (Susa Eräranta and Aija Staffans, 2015). This increases the significance of information use and systemic understanding in urban planning practice. A city changes all the time, and so does the mental representation of the city. Accordingly, interactive methods are needed which can increase the understanding of systemic urban complexity. The 21st century seems quite different than the 20th in the capabilities people need for work, citizenship, and self-actualization. In response, urban planning educational systems must transform their objectives, curricula, pedagogic, and assessments to help all students attain the sophisticated outcomes requisite for effective contributions in work, citizenship and environmental sustainability.



5. PRINCIPLES OF LEARNING FOR THE TWENTY FIRST CENTURY

21st century skills emphasis on process (analysis, critical thinking, and cooperative learning) which fosters concern that students lack knowledge and generates a back-to-basics movement that emphasizes content, which fosters concern that student are merely parroting facts with no idea of how to use their knowledge, and so on. Knowledge, skills, competencies and attributes are outcomes of initial planning education. Planning education need to provide a critical and analytical component that is essentially and qualitatively different from what may be seen as 'training', which is part of continuing professional development and lifelong learning. For planning studies, in contrast, the capability to think over and systematically engage with unsolved problems is central, both inside and outside one's discipline, theoretically and practically, large and small, and, to be able to report clearly about them. Teacher should therefore report and lecture on how they have tried, and are trying, to solve difficult real-world problems, whether they failed or succeeded. This then belongs to the knowledge base of what is accepted today as proven knowledge. Academic teaching designed in such a way would also be of the highest practical importance. Students must be able to engage in theoretical, practical and ethical debate at the forefront of the area of the different areas of planning such as environmental planning, transport planning, urban regeneration, infrastructure planning and urban design. In 21st century context these are the not only right categories, competencies or paths. These categories might be collapsed or renamed, and other paths such as community planning, sustainable development, urban research, housing, urban regeneration, regional planning, historic conservation, development planning, smart city planning or international planning might be substituted or added. Current urban planning field need diversified competencies and competencies could be added, deleted, moved, or renamed. Urban planning needs change in order to reach the normative objectives of smart cities demands methodology, which emphasizes the integration of knowledge management, systems thinking and collaborative methods.

In repose to the challenges and difficulties thrown by current urban development and most of these difficulties are the result of an inability to cope effectively with the consequences of both global and local change and the extreme complexity of urban and regional systems, the main suggested components of good practice of teaching and learning process are discussed below.

6. CREATIVITY IN PLANNING

In current planning education teaching mostly offered through research-oriented higher education. Such approach does not configure to develop creative competencies among students. Most programs focus on students' knowledge acquisition and development of rational, analytical skill which



does not help to promote students' creative potentials. Creativity has been identified by individuals and scholars as the key to unlock intellectual potential necessary to address an array of complex problems faced by society, such as climate change, deprivation, or planning for sustainability (e.g. Dewulf and Baillie, 1999). It is ever more being recognized that urban planners and policy-makers lack an effective future oriented approach that would enable them to anticipate future transformations, efficiently prepare for ensuing consequences and tackle the inherent complexity. For new 'spatial' planning culture, planners need to be charged with space and place making to help deliver sustainable communities. The new focus of 21st century requires planners to become leaders, social entrepreneurs and facilitators, who work in interdisciplinary settings to promote urban life styles embedded with modern technology that prevent the deterioration of the environment and enhance human quality of life. In order to fulfill sustainability goals planners will need to break the rules and develop new ideas. In planning, creativity is mostly associated with physical planning where students try to learn and apply third dimension of space in place making, urban design and renewal. Many times creativity is perceived as outcome of design modules. However creativity development goes beyond the mere artistic aspect of design and encompasses traditional subject knowledge and skills and cognitive rational learning outcomes.

There is a growing need for planners, decision makers and communities to become more creative and imaginative in the way they think, talk and act about the future of their cities. Just like planning itself must always be prepared for change and use the best (but often imperfect) current information to make good quality decisions and chart a vision for the future of a place, spatial planning requires 'knowledge of how relationships in place and space both change and develop over time and are open to positive influence by creative planning' (RTPI, 2012). There is a growing demand for professionals to think creatively, and develop and design corroboratively innovative and novel solutions. In order to develop true innovation we need to challenge old patterns of responses, and planners need dare "break the rules" and create new solutions (Sandercock 2004, p 136). In the context of low carbon society for future the challenge for planner is to fundamentally review the state of land and cities from resources efficiency point of view. Creativity in urban planning will help to creating sustainable cities that integrates low carbon society.

7. ENABLING EXPLORATORY LEARNING

In this method using unsolved problems with real connections to actual practice must be the core of learning. Here teaching is more about coaching students to open their minds to various solutions and about being able to evaluate suggestions



from the students through experimental knowledge drawn from one's own practice. The key element is the learning-by-doing approach within a quasi-real-world situation, often involving group working and group dynamics skills. This method uses a domain theory - the available background knowledge. Students can learn from a single training example. If - then rules are generally intuitive (readable). This method is widely used. Learning the required knowledge is achieved in this method not through the reproduction of presented information, but mainly through the first-hand experience of exploratory learning. For many academics, this kind of learning is unusual because the outcome of each process is open and brings with it the adventure of exploring unknown territory and it makes teachers into a supervising partner for students as well as a partner in collaborative learning.

The main weakness of this method is that it requires knowledge of a domain theory - incorrect domain theory can lead to incorrect deductions. We have known about the importance of asking critical questions before giving any answers. With respect to learning domain theory, exploratory learning could play an important role in enabling a planner to be effective in an environment with an incomplete domain theory and laced with uncertainty. This method can enable students to understand issues such as sustainability via immersive engagement with places and communities, which can encourage motivation and collaboration. This method also enables the 'propositionalization' of the planning problem, wherein lifted representations of the domain theory were forsaken for the faster processing of 'grounded' versions involving only propositions. Exploratory learning-by-doing and using the best available knowledge is essential for academic discourse and progress in our action-oriented academic domain. Higgins *et al* (2009), Temple (2004) all highlights the importance of experiential learning, with work-based elements where appropriate, and this is linked to 'problem-based learning' and stressed that studio work can equally involve policy or strategy development, and can develop skills such as policy analysis and report writing.

8. INTERDISCIPLINARY LEARNING

Just beyond that body of knowledge, but still within the knowledge of the teacher, is the Zone of Proximal Development, representing what the student can't quite do on his / her own, but can do with the help of the teacher. Because learning through interaction with others pushes student development, studio courses that foster a process of discovery and interdisciplinary collaboration are most effective. RTPi Education Commission Report (2003) advocated the ideas of spatial, sustainable, integrative and inclusive have also been used to facilitate reform of the planning education system in the UK, which aims to nurture an inter-disciplinary learning environment that can promote 'critical thinking about space and place as a basis for action or intervention.



There is general consensus in academic field that experience of integrated learning between related disciplines and professions can be extremely valuable. The value of this approach is that the process of discovery, interdisciplinary collaboration, and metacognition are interwoven and often occur simultaneously. This method is extensively applied in higher education in order to connect theory with practice. All built environment courses give thrust to prepare for 'cross-disciplinary understanding' and in this context Farrell (2014) stressed the need for inter-disciplinary education. Along with interdisciplinary approach urban planning also involve inter-professional working with other built environment professions such as architecture, real estate engineer, and civil engineering, given the clear linkage to many real-life work contexts. Inter-professional working can be effectively applied via project working within a built environment context, with evident benefits in terms of preparing students for the realities of much contemporary practice.

9. RESEARCH LED TEACHING AND LEARNING

We often hear from prospective employers the lack of practical use of planning research as perceived by practitioners. Many employers still consider planning education to be lacking in practical application. This implies the need for continued action to link research and practice more effectively within planning education. There is substantial evidence relating to the benefits of fostering a research-led learning environment in higher education institutions and the value of learning through research. In teaching urban planning to understand urban complexity the range of teaching and learning methods needed which aimed to embed research into the academic experience, thereby facilitating students' active learning. Research-led teaching often takes many different forms, reflecting the fact that different academics prefer to interpret and implement this concept from different dimensions, using different procedures, through different formats and to different extents, taking into account their intrinsically varying incentives.

The 'inquiry-based learning', where students are actively involved in the 'process' of research (e.g. research simulation activities, content dissemination, etc.) is considered useful to promote active learning in the built environment related different disciplines. It regards research as a process of edification and understands academic education as participation in research (Deakin, 2006). Many planning schools in UK offers a range of research-led specialist option modules for postgraduate planning students which reflects research specialism. This creative, generative and reflective 'learning-by-doing' process also requires and develops higher cognitive capabilities and fosters innovation. There is an urgent need to foster a research-led learning environment in urban planning which can facilitate innovative educational practices or similar.



10. CONCLUSIONS

This paper presents a viewpoint about transformation and improvement of urban planning education at a time when new challenges are thrown by complex urban systems. In a globalized world with limited natural resources - where land plays a key role - the challenges of severe changes in world population and climate will increase demands on the quality of education in urban planning. To evaluate the quality of different capabilities in a student requires that the educator has experienced them - and continues to experience them - as lack of actual experience will cause problems in the attempts to clarify or explain both problems and solutions. Major transformations of the planning context in recent years, which is now characterized by accelerating change, growing uncertainty, strengthening economic competition between cities, changing nature of urban governance, environmental pressures, and social, cultural and demographic shifts.

Dynamic learning environments emphasize the nexus between theory and practice, fostering capacity for planners to lead public policy and discourse for sustainability and social equity, in a climate of rapid societal change. In order to ensure the future prosperity and sustainable growth of cities and urban regions, it is necessary to change the way of thinking and acting about the future of cities. Today's urban planning education model generally supports the development of one kind of analytical thinking. There is a need to balance with a focus on synthesis, analytical and practical aspects of successful intelligence. The special task of academics is to examine the world with open questions and to remain learners throughout their entire lives: in practice, in education and in research.

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Critical Issues and Option for Management of Water in Indian Urban Sector

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Abstract

The rapid rise in urban population, heavy demand of land for commercial and residential development, etc., resulted in filling of surface water bodies by earth or by other filling materials and then buildings take place on it. Natural water bodies and drainage channels are being encroached upon and diverted for other purposes. The heavy dependence on ground water led to over exploitation. Rainfall is the main source of groundwater recharge, and the water table normally rises in response to rainfall in particular period. This relation has been changing because of the reduction in the number of water bodies which led to rapid decline of ground water level and drying up of shallow wells / bore wells in many parts of urban and rural India. This paper attempts to highlight some critical issues on water resources and options of various tools and techniques available to meet the urban water demand.

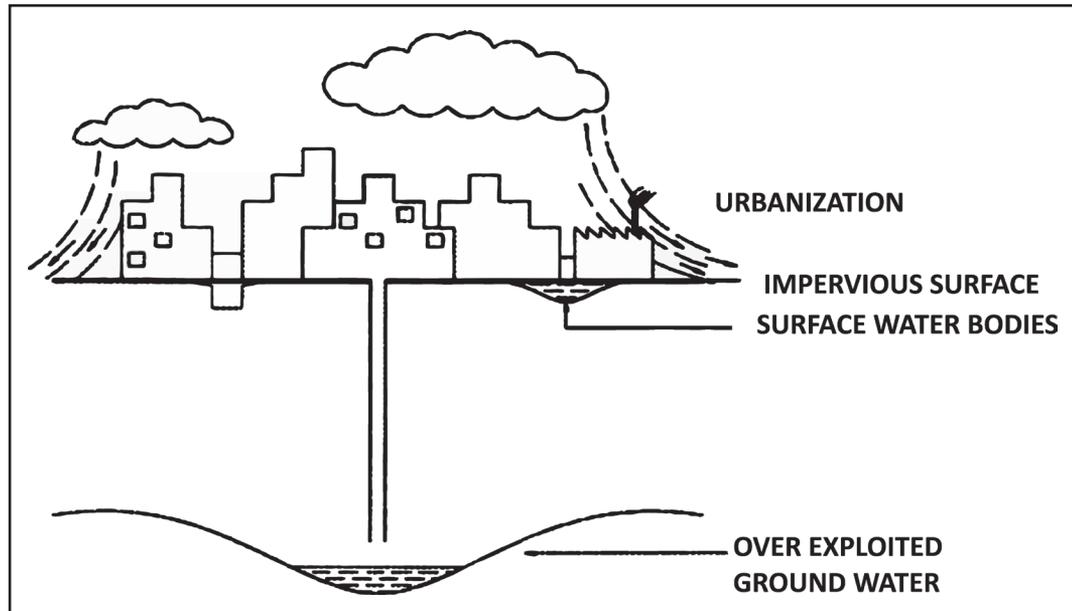
1. INTRODUCTION

Water is a natural and scarce resource. Livelihood, food security and sustainable development depend on water (National Water Policy, 2012). Rapid rise in urban population due to migration from rural area has resulted in increased commercial and housing development. The increase in population and the subsequent heavy demand for land for commercial and residential development resulted in filling up of surface water bodies and being built upon. Natural water bodies and drainage channels are being encroached upon, and diverted for other purposes. Hence, the requirement of water depends on ground water. Heavy dependence on ground water led to over exploitation of ground water. Rainfall is the main source of groundwater recharge, and the water table normally rises in response to rainfall in particular period. This relation has been changing because of the reduction in the number of water bodies, blocked ground water recharge zones due to rapid urbanization and the over exploitation of ground water (Fig. 1). This led to rapid decline of groundwater levels and the drying up of shallow wells and bore wells in many parts of urban and rural India. This imposes an extra burden on the water supplied for urban areas (Nandimandlam and Reddy, 2007). Access to safe water for drinking and other domestic needs still continues to be a problem in many areas (National Water Policy, 2012).

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Fig. 1: Present Scenario of Water in Indian Urban Context



In the coming years the demand situation is projected to become worse. Water supply for the average citizen could drop from an average of 105 liters to only 65 liters a day with a large section of the population having no access to potable water (PanIIT Conclave, 2010). Nearly 15 percent of the aquifers have been in crisis and 60 percent will be in crisis by 2030 in India (Singh, 2016).

2. PRESENT SCENARIO OF WATER IN INDIAN URBAN CONTEXT

India has more than 17 percent of the world's population, but has only 4 percent of world's renewable water resources with 2.6 percent of world's land area (National Water Policy, 2012). There are over 8,000 urban settlements in India currently (Census, 2011). Endowments of rain water, ground water, surface water flows, topography and temperature have a wide range of variations all over India. There are wide geographical variations in resource availability and methods of disposal within a large Indian urban area (Bhatnagar, 2009).

2.1 Ground Water Resource Potential in India

Surface water resource potential in India is estimated to be around 1,869 cubic km. Due to topographical constraints and spatio - temporal variations in resources, it is estimated that only about 1,123 cubic km i.e. 690 cubic km from surface water and 433 cubic km from groundwater (Central Water Commission, 2010) can be used (Gaur and Amerasinghe, 2011).

Rapid development of ground water resources for varied usage has contributed in expansion of irrigated agriculture, overall economic development and in



improving the quality of life in India. Ground water, which is the source for more than 85 percent of rural domestic water requirements, 50 percent of urban water requirements and more than 50 percent of irrigation requirements of the country, is depleting fast in many areas due to its large-scale withdrawal for various sectors. Ground water development with time has changed the hydro geological regime and as a result natural recharge components have altered to a great extent. The assessment units (Blocks / Mandals / Talukas) in the country are shown in Table 1. In last 40 years development has taken place due to availability of physical infrastructure like electricity and funding from various agencies. This is indirectly depleting ground water level (GOI, Master Plan for Artificial Recharge to Ground Water in India, CGWB, 2013).

2.2 Per Capita Water Availability in India

According to the Food and Agriculture Organization (FAO), United Nations, per capita availability of less than 2,000 m³ per year is defined as a water-stressed condition, and the per capita availability below 1,000 m³ per year is termed as a water-scarce condition (Gaur and Amerasinghe, 2011).

India is divided into 20 river basins. Out of these, 14 basins are in a water-stressed condition of which 10 are water stressed (Gaur and Amerasinghe, 2011). Like other rivers of the world Indian rivers are drying or receding every year. But it's not just happening elsewhere but also happening in India. The glaciers feeding water for the Ganga are melting faster than it should. It means the Ganga could

Table 1: Dynamic Ground Water Resources of India

S. No.	Year	31st March 2004	31st March 2009	31st March 2011
1	Annual Replenish able Ground Water Resources		431 bcm	433 bcm
2	Net Annual Ground Water Availability		396 bcm	398 bcm
3	Annual Ground Water Draft for Irrigation, Domestic & Industrial uses		243	245 bcm
4	Stage of Ground Water Development		61 %	62%
5	Categorization of Blocks/ Mandals / Firkka Talukas			
	Total Assessed units	5723	5842	6607
	Safe		4277	4530
	Semi-Critical		523	697
	Critical	226	169	217
	Over Exploited	839	802	1071
	Saline	30	71	92

Source: GOI, Master Plan for Artificial Recharge to Ground Water in India, 2013 and GOI, Dynamic Ground Water Resource in India, 2014



dry up in about 60 years or so. This would leave over 50 million people thirsty who are living on the banks (Jain, 2016).

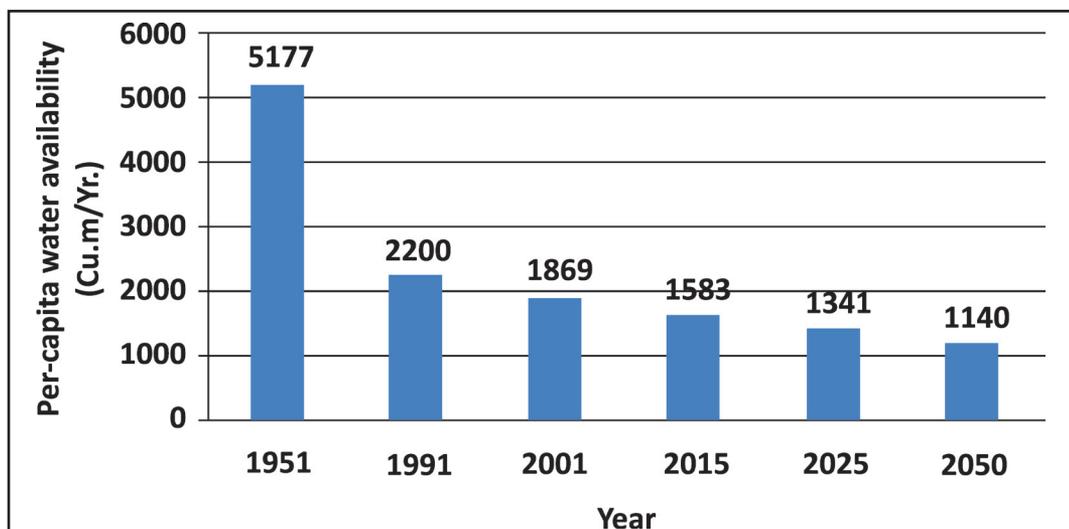
The availability of fresh water per capita has come down in India from about 5,177 cubic meter per head in 1951 to 1,820 cubic meter per head in 2001 and it is expected to further go down to 1,140 by 2050 AD (Fig. 2). There is wide disparity in basin-wise water availability due to uneven rainfall and varying population density in the country. The availability is as high as 14057 cu m per year per capita in Brahmaputra / Barak Basin and as low as 307 cu m per year per person in Sabarmati basin. Many other basins like Mahi, Tapi and Pennar are already water stressed (GOI, 2013).

The stress on water resources (both surface and groundwater) is increasing rapidly due to rising demands of various users and the deteriorating quality of water. In many regions in India the extraction of groundwater is more than the recharge. The pollution of water resources caused by discharge of untreated municipal sewage and industrial effluents in rivers and the sea, and agro-chemicals penetration in ground water has further exacerbated the availability of good quality water. In short, the country’s fragile resources are stressed and are depleting fast, both in quantity and quality (Gaur and Amerasinghe, 2011).

2.3 Rainfall of India

India receives about 120 cm of rain in a year. However, distribution of rainfall has a wide variation both in space and time. Most of rainfall (about 75 percent) occurs during a short span of four Monsoon months (June to September) resulting into eight relatively dry months. Major part of country including Northern,

Fig. 2: Per Capita Water Availability in India



Source: Sharma, 2015 and GOI, 2013

Central and Eastern India receives annual normal rainfall between 75 and 150 cm. Highest rainfall of more than 250 cm is received in the North Eastern States and along West Coast in the Konkan region whereas western Rajasthan receives about 15 cm of rainfall in an year. The average rainfall for the three year period (2009 to 2011) is within the normal range for major parts of the country (GOI, 2014).

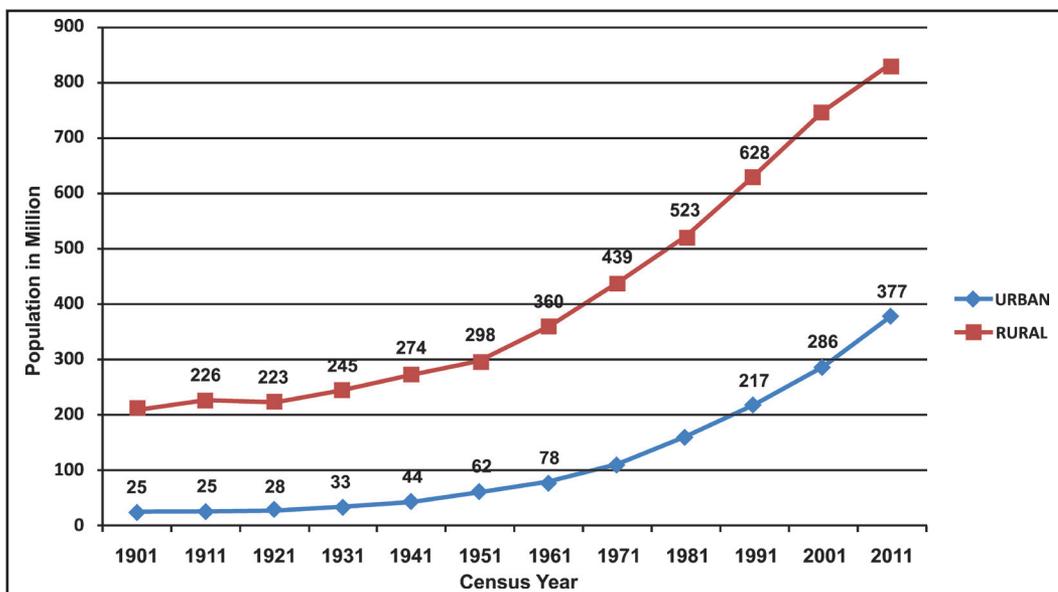
2.4 Urbanization

Urbanization is a one of the biggest challenge in India. India had about a fourth of population during starting of economic reforms in 1990. Right now there is about one third population and expected more than half of Indian population will live in cities (Sen, 2013). As per census 2011, for the first time since Independence, the absolute increase in population is more in urban areas that in rural areas (Fig. 3) .Level of urbanization increased from 27.81 percent in 2001 Census to 31.16 percent in 2011 Census. The urban population in India is 377 million according to Census report (Census 2011). There were 6000 urban settlement in India during 2009 and this number is exploding (Bhatnagar, 2009). According to Census 2011 there are 7935 urban settlements. Trends in urban distribution in India are 10.8 percent, 17.3 percent and 31.2 percent as per census 1901, 1951 and 2011 respectively (Census of India, 2011).

2.4.1: Impact on Water Resources by Urban Development

Urban development uses water resources in many ways. The growing urban population impose increasing demand on provision of water services including water supply, ground water loss, waste water collection and management and

Fig. 3: Trend of Urban and Rural Population in India





finally leading to water pollution control at receiving end. Urbanization in India generally increase the impervious covers of ground to a large extent and thus discharge the surface runoff move quickly to the nearby areas, which in turn contribute to urban flooding and its consequent damage to all inhabits a phenomena which was not so prevalent time in earlier time (Sen, 2012).

2.4.2: Water Supply Services in urban area

The National Water Policy, Ministry of Water Resources, Govt. of India has assigned the highest priority for drinking water supply needs followed by irrigation, hydro-power, navigation and industrial and other uses since 2002 (www.indiaenvironmentalportal.org.in/files/Water-Assesment). The bulk of the households in urban India depend on the municipal water supply for their daily needs—more than 70 per cent depend on tap water and an insignificant number on tankers. Access to underground water is the next most important—wells, tube wells, and hand pumps, together account for more than 27 per cent of the households' main water supply. As would be expected, other sources that include tanks, ponds, springs, rivers, canals, etc. are insignificant in urban areas (Bajpai and Bhandari, 2004) Now 50 percent of urban water met from ground water (GOI, 2014).

As per National Sample Survey (NSS) Report no. 535, Housing Condition and Amenities in India, July 2008 - June 2009, In India average 74.3 per cent households among 35 states have access to tap water facilities in urban area with minimum 9.5 per cent at Lakshadweep and maximum 99.1 percent at Chandigarh (Infrastructure Statistics, 2014).

2.4.3: Water Losses in Indian Water Distribution System

A National Environment Engineering Research Institute (NEERI) study finds that 17 to 24 per cent of total flow in Indian distribution system is lost through leakage and about 82 per cent of this takes place in the housing service connection, and the rest is due to leakage in pipeline (Goyel, 2004). The technical estimates of the municipality reveal that the losses on account of bad joints, leakage and waste etc., accrue to 26 percent of total water supply which is so much higher side. These are because of water wastage especially through public stand posts (Minhas and Johari, 2006). There are cases with sufficient supply of municipal water or no supply. People have to carry water from long distances. It was found that those who carry water from distance use it carefully as compared to those getting more than required at home (Paikra and Puntambekar, 2013).

3. CASE STUDIES ON WATER MANAGEMENT TOOLS AND TECHNIQUES

3.1 Rain Water Harvesting (RWH)

Rain water harvesting is simply the capturing and storing the rainwater, when and where it falls, by different methods for infiltration and percolation into

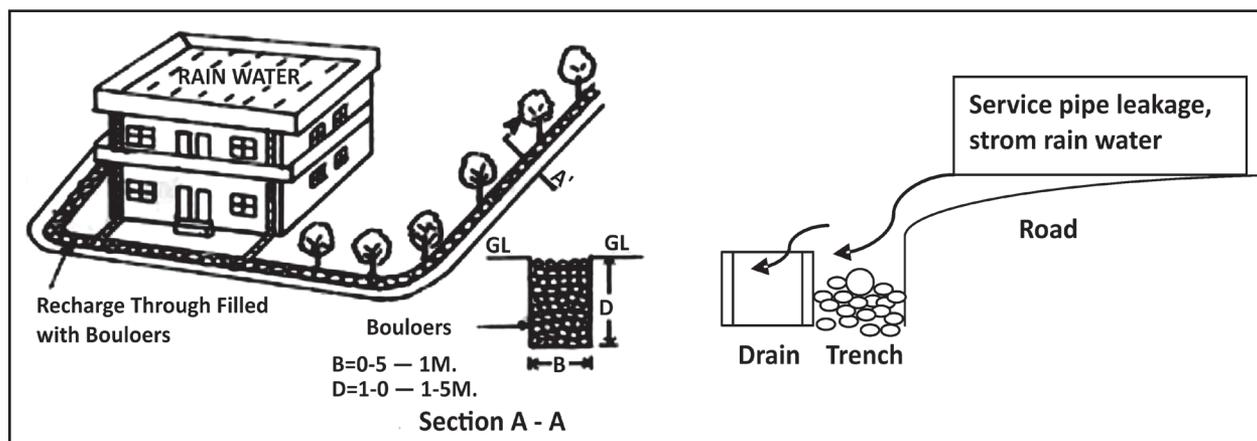
underground to augment the ground water reservoir. RWH is the only long term solution to chronic water shortage in urban area. In urban areas, recharge of ground water through storm runoff and roof top water collection, and the diversion and collection of runoff into dry tanks from play grounds, pavement, parks and other vacant places can be implemented. Several methods of RWH for artificial recharge are in vogue, the selection being dictated by local hydro-geological and soil conditions (Todd, 1980).

Centre of science and Environment, New Delhi, effectively identified sixteen RWH projects in and around Delhi as a part of their campaign for community awareness program. The impact on the quality and quantity of ground water in the respective location has been found to be remarkable, proving beyond doubt that the RWH is one of the effective tools to arrest the rapidly depleting ground water resources (Sen, 2005). A bout 26 percent quantity of losses of water in Water supply through pipe lines and public stand post can be used for recharging the groundwater per day by appropriate technique like recharge through trench (Fig. 4), which is common method for RWH.

3.2 Rejuvenation of Ponds and Lakes

During the past years there is a realization that these ponds / lakes have to be restored with a view to making them reliable source of fresh water all through the year. With increased urban activities and population, the need of potable water has diversified as well as gone up. The Lakes help recharge groundwater, support livelihood by way of fishing and grazing and quench the thirst of the bovine population simply by harvesting rainwater, ensuring its storages and making the overflow seep into ground the best insurance against water scarcity and water logging (Gowda and Sridhara, 2013).

Fig. 4: Recharge through Trench



Source: GOI, 2002



3.3 Water permeable Roads

Engineers involved in road construction in London have developed a road with a top mix permeable surface which absorbs the water as foam. This road absorbs 880 Gallon (3637 Liters) water per minute. The top mix is permeable with small holes on top. Its surface is a water absorber. This road is suitable for urban flood. Water does not deposit on the road and it is slip less. It is suitable in hot climates. The absorbed water enters the ground water table (Nav Bharat, 2015).

3.4 Water Recycle / Reuse of Sewage Water

All water-based activities in urban do not always require good quality water. Some activities may be performed with “gray water” (re-used / recycled water). It is important to identify opportunities for the collection and reuse of gray water (domestic, industrial wastewater, except from the toilet) wherever possible. Possible uses for grey water include toilet flushing, washing cars and patio, watering plants, etc. Some case studies and techniques are described below.

3.4.1 Waste Water Recycling in Australia

Waste Water Recycling in Australia
New concept of Water Mining: The approach involves mining sewer-initial screening - separating solids-biological treatment-micro filtration-hypochlorite disinfection. The concept is suitable for watering parks, gardens, crops and other secondary usage not involving water contact. The pilot scheme is developed where 300 Kilo liter per day is successfully irrigating 9 hectare of parks and play fields. The basic approach involves extracting waste water from underground sewers, treating it on site through a three stage process and recycling it for use in surrounding areas. The wastes are returned back to the sewer for treatment further downstream. The main advantage is that, there is no capital investment of large pipes. An opinion survey conducted on Canberra’s residents indicated 97 percent strongly accepted the system of reuse of effluent for irrigation (Chhattopadhyay, 2006).

Similarly in Mandir Hasaud, Chhattisgarh, as per an estimate 1600 million liters water is deposited in empty mines. This water is being used through canals. Three Pumps of 3 horsepower each are installed in the mines and 0.5 million liter water is withdrawn per day (Nai Dunia, 2016).

3.4.2 Concept of Sewage Fed Fishery

This is a unique approach of sewage fed fishery and garbage and sewage farming, traditionally conceived and practiced by folk fishermen of Calcutta (now Kolkata), India. In India, the city of Calcutta had a unique system of treating sewage through sewage fed fisheries. The natural slope of the city towards the east created the wetlands of Calcutta. Storm water flow and dry weather flow canals were excavated as early as the 1990s. The sewage estimated to be 680 ml/day is utilized in the sewage treated fisheries as nutrients, and the wetlands purify in



water through oxidation and radiation. The basic features of these eco - systems are:

- Shallow depth of fisheries, (1 m) for sunlight to penetrate to the bottom;
- Abundance of solar energy;
- Lowering of E-coil and BOD value; and
- Considerable increase of dissolved oxygen value.

Originally, a tidal river swept the area, and the salt water was suitable for salt-water fish. The river died in course of time by silting process and the city sewage started getting dumped on the swampy area. This reduced the salinity considerably, from 800-1200 ppm to 500 ppm (parts per million), and the conditions became ideal for sweet water fisheries (Chattopadhyay, 2006).

3.4.3 Omini Water Treatment Plant

Omini Water Treatment Plant may be an alternate technology for drinking water crisis in countries like India. In this process 86,000 liter drinkable water can be obtained from the sewer of 100,000 people. Electricity can be produced in this plant as a by-product. In Omini Water Treatment Plant the squalor is sent to a drier by machine through a conveyor belt to separate it from water in high temperature. The water of sewage (excreta) evaporates and is sent to a cooling tube through a pipe. Here squalor becomes dry. The vapor of the second face moves in a cleaning system pipe till getting the clean water (Hari-Bhoomi, 2015).

3.4.4 Small Scale Community Technology (SSCT)

The SSCT aims to operate at local community level with following characteristics

- Simple operation and maintenance methods.
- Minimizes high skill demand.
- Low operating and maintenance cost.
- Uses local resources and materials where ever possible.
- Easily adjustable to different circumstances at the local level.

Australian SSCTs are known as BioMAX and Ecomax. These two types of technologies are well known in Australia as small high performance sewage treatment systems used at the local community level.

3.4.5 Intermediate Technology (Reedbed Channel System)

In almost all cities and towns of India, wastewater flowing through long open drains that is either redirected for use in agricultural field or collected in ponds (meant to store storm water run-off) for later use, is common. By converting

**Table 2: Design Detail of Reed-Bed Channels**

Average width	2.25 m
Depth of gravel bed - Bottom 12 mm gravel layer :0.1 m - Middle 25 mm gravel layer :0.2 m - Top 40 mm gravel layer :0.3 m	0.6 m
Porosity of the gravel bed	30-40%
Theoretical hydraulic retention time in the bed	2-3 days
Slope of gravel bed	0.2-0.3%
No. of plants	2-3 per m ²
Hydraulic retention time of detritus tank	45-60 min.

Source: M. Sundaravadivel, 2002

to bypass the flow in excess of twice the peak dry weather flow are the other requirements. The reed bed channel arrangement for waste water treatment will offer the following advantages:

- Treatment require little or no additional land
- Utilization of existing drains will reduce system costs.
- Running waste water in the channel will not support mosquito breeding, which has been reported as a public health hazard with waste stabilization ponds or conventional constructed wetlands.
- There will be no spreading and stagnating waste water over a large area as in waste stabilization ponds or conventional constructed wetlands.

By planning the combined surface sewerage system to comprise two or more independent networks, each ideally draining a population of 10,000-15,000, quantity of wastewater to be treated by the reed-bed channels, and hence the area requirement at any one site can be kept at lower levels. Design detail of the reed-bed channels are presented in Table 2.

3.5 Water Efficiency in Domestic Centre

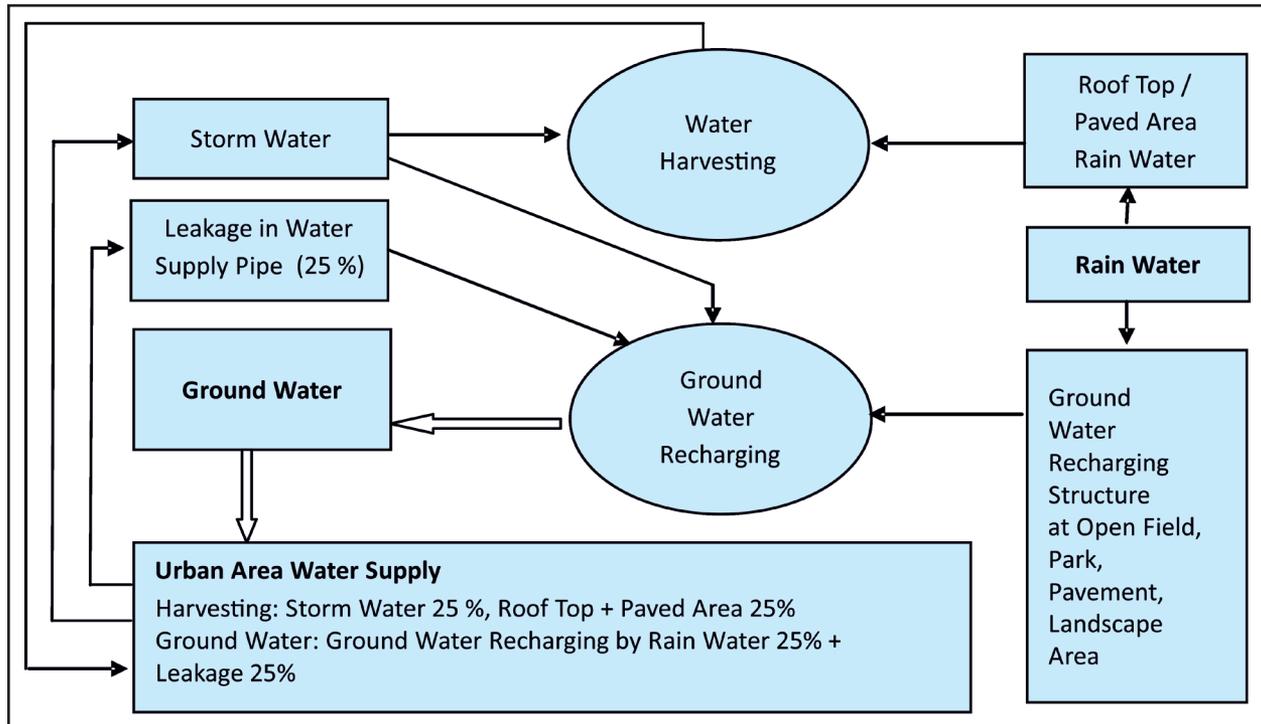
Efficiency can be achieved in the domestic setting through the use of several water saving technologies. Application of simple improved management techniques employing water reuse practices and changing behavior, without compromising on quality of life Remarkable 50 percent - 80 percent water can be saved in various activities in domestic sector (NTUA, 2013).

3.6 Interlinking of Reservoir in Mumbai

Tansa and Modak Reservoirs are the main source of domestic water in Mumbai. During below average monsoon the water level of Tansa go to its lowest level. The overflowing Modak Sagar Reservoir constructed near Vaitarana river,

these terminal (trunk) drains into gravel media beds supporting commonly found Indian wetland plants such as *Phragmites carca* and *Typha latifolia*, surface flow reed-bed channels for treatment can be developed. During lean flow periods of the day, the beds will function as sub-surface flow reed beds. A detritus tank pretreatment preceded by storm water overflow structure

Fig. 5: Schematic Diagram of Urban Water Management



diverted to the Tansa reservoir and the 50 Million Gallon (189.3 Million Liters) overflowing water collected in Tansa Reservoir (Raghuraman, 2012).

3.7 Conventional Water Recharging and Conservation Structure

The ancient water management systems show that the traditional knowledge of water management was efficient as well as eco-friendly (Paikra and Puntambekar, 2013). There were minimum disturbance to natural systems like hydrological cycle, soil, vegetation, etc. From more than 5000 years rain water harvesting has formed a part of Indian traditions and over centuries, Indian have developed ranges of techniques to harvest rain water to the last drop. Kund (Kundi), Bawli (Stepwell), Phad and Bhandara, Haveli, Kare, etc.; are a few traditional Rain water harvesting system and Zing, Guhal, Jobo, Ahar pyne, etc., are some of the water conservation used in different parts of India through history.

4. CONCLUSIONS

To frame an integrated strategy for urban water security is absolutely necessary today. There is no single solution that can be employed but rather a multitude of strategies can be used to achieve water security. There are so many technologies for water supply available in India. The major challenge is to select an appropriate technology considering the multifaceted issues including technical feasibility affordability, custom and practices, preferences and institutional



support available. Rain water is the main source for ground water recharge. Artificial recharging of ground water by rainwater harvesting in paved and unpaved areas (open fields, parks, pavement landscapes, etc.) can fulfil around 25 percent demand of urban areas. Ground water recharging fulfils about 25 percent water demand. Roof top rainwater harvesting meets another 25 percent urban water demand. Water losses in pipeline supply can be used for ground water augmentation, which is about 25 percent of supplied water. The same water recharging structure trench can be used for recharging ground water by rain water or storm water runoff.

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