
An Assessment of the Urban Infrastructure in Residential Areas of Indian Metro Cities: A Case Study of Jaipur City

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ABSTRACT:

With the advancement of technology and a tremendous boost in the Indian economy in the past few decades, the urbanization in the country has taken a pace never seen before in the history attracting even more population from the rural areas and burdening the urban services further more. The inherent weaknesses and shortcomings in the urban infrastructure management of our cities in a developing country like India are clearly reflected in the inaccessibility of a major portion of the population to these services. This paper presents the assessment of the urban infrastructure services in the city of Jaipur, popularly known as Pink City, to understand the picture of the infrastructure provisions in the Indian metropolitan cities through a primary survey. The survey is conducted with the help of questionnaires and structured interviews and is limited to only residential sector. There is an effort for the analysis of the quality of various services in the city from the people's perspective instead of the government agencies.

Keywords: *Urban infrastructure, Jaipur, Weighted Index Method, housing, urban environment.*

1. INTRODUCTION

India, though slow as compared to the other developing countries like China, Indonesia, etc. is developing and urbanizing at a very fast rate. The Census of India, 2011 (Provisional Population Totals, Urban Agglomerations and Cities) has defined the urban area as;

1. All places with a municipality, corporation, cantonment board or notified town area committee, etc.
2. All other places which satisfied the following criteria:
 - i) A minimum population of 5,000;

- ii) At least 75 per cent of the male main working population engaged in non-agricultural pursuits; and
- iii) A density of population of at least 400 persons per sq. km.

The definition provided clearly indicates that the term ‘urbanization’ in no way guarantees the provision of quality infrastructure and its quality. In addition to this, according to the Census of India, 2011, out of 1.2 billion population, 0.38 billion population comprising approximately 45% of the total population is urban, (Demographics of India) which is suggestive of the fact that the present population as well as the future generations are going to produce a great burden over the infrastructure services in the urban areas, especially the metropolitan cities. If this problem is not addressed immediately, this existing gap between the demand and supply of the urban services will keep being a major setback to our economy. Even after the combined efforts of the Ministry of Urban Development, JNNURM (Jawaharlal Nehru National Urban Renewal Mission), State Government and Urban Local Bodies, the existing conditions present a horrifying picture of the failure of all the public agencies on their part.

The state of Rajasthan, the 8th most populous state of the country with a population of 68 million, according to the Census 2011, is no exception to the above stated problems. The state had a growth rate of 28.33% in the past decade with the 5.6% of the country’s total population at present. Out of this, 1.7 million people live in urban areas of Rajasthan making it the 24.87% of the total population of Rajasthan (Demographics of India). The city chosen for the study is the largest in Rajasthan in terms of area as well as population, i.e. Jaipur, also famous as the ‘Pink city of India’. (Fig. 1) The city is well known for its rich heritage and culture attracting not only domestic tourists from the country but international too on a very large scale.



Fig. 1: Google image of Jaipur region

2. EXISTING URBAN INFRASTRUCTURE IN THE CITY

The Jaipur city has a proper institutional framework consisting of urban local bodies working in collaboration with the other public and private agencies for the provision of urban infrastructure. The Government of Rajasthan has set up Rajasthan Urban Infrastructure Development Project (RUIDP) with the aid of the Asian Development Bank which further helped in initiating JNNURM (Jawaharlal Nehru National Urban Renewal Mission) in delivery of urban services. The action plan prepared by JNNURM for the urban renewal of Jaipur further improved the situation. The other agencies involved in the delivery of urban services in the city are Jaipur Development Authority (JDA), Jaipur Municipal Corporation (JMC), Rajasthan Housing Board (RHB), Public Health Engineering Department (PHED), Public Works Department (PWD), Project Development Corporation of Rajasthan (PDCOR), Jaipur Traffic Board (JTB) and many more. Even after the introduction of e-governance and computerized equipment and materials in the local bodies, there is no centralized database and information system in for access by the people as well as these authorities. This piecemeal approach to the provision of infrastructure by all the different local bodies according to their own methodologies without a comprehensive approach for a sustainable development has totally shattered the chance of an overall development of the city. As per Census 2001, the city of Jaipur within the municipal limits has a shortage of 8.3% housing and 15.87% of the total population is residing in slums. The functioning of the cooperative societies in the past, though banned at present, have created havoc in the real estate sector. The sub divisions of land by these societies are generally illegal and the status of infrastructure in the land developed by them even after continuous efforts of JDA by regularization is still very poor. The interventions by the public agencies with the help of JNNURM including the poverty alleviation programmes are not sufficient to combat the problem of slums, the reasons being an increase in the levels of poverty, inadequate coverage of poverty alleviation programmes, etc. Moreover, only 81% of the total city's population has access to the individual water supply from PHED and the quality of water supply in some areas is very poor especially towards the south of the city. Almost all the households (99.05%) have electricity supply and 94% have street lighting though the quality of the street lighting is quite poor. Almost 17% of the population does not have access to any kind of toilet facilities. The areas of the solid waste management, drainage also need attention just

like water supply. More than half of the households complain regarding the cleanliness in their streets and almost 20% of the households have no access to any drainage facility at all. Similarly, the sewerage system covers only 65% of the total area of Jaipur leaving the other households the option of either using septic tanks or defecating in the open (Jawaharlal Nehru National Urban Renewal Mission overview). The constant growth in the number of personal vehicle users as well as the accidents on the road network in the city merely reflects the quality of the urban public transportation system along with the issues of parking. Though, the projects of BRTS (Bus Rapid Transit System) and MRTS (Metro Rail Transit System) are in pipeline and have progressed on real grounds also to a certain extent, their chances of success after implementation is highly debatable.

3. INVESTIGATION AT THE MICRO LEVEL

A detailed investigation is done pertaining to the socio-economic conditions; availability and level of infrastructure facilities; etc., in the study area and the results are presented thereafter. To understand the functions of the city at the grassroots level, survey research methods have been employed.

The author has conducted a detailed investigation to understand the level of infrastructure in a broader sense with the help of other socio-economic characteristics to understand and establish a relationship among the various functions, i.e. socio-economic conditions to the availability of infrastructure facilities, the variables, such as, water supply, waste management, housing, transportation, open spaces and recreation, health, living environment, etc. Out of the many variables, a few are presented in the paper.

At the outset, the author has done the primary survey in selected 300 households in Jaipur city from different areas with different characteristics within the municipal limits by employing the schedules at the grassroots level to understand the condition of the area.

3.1. Socio-economic characteristics of the study area

The socio-economic characteristics of the study area are analyzed based on the survey results.

3.1.1 Occupation The occupational structure of an area is an important indicator to understand the status of development of the region and it more or less influences the households, household income, standard of living, etc. This results in influencing the overall development of the system. The detailed occupational structure of the households and

persons employed among the surveyed households is presented in Fig.2. Since the survey has been conducted in an urban setup, there is no primary sector involved.

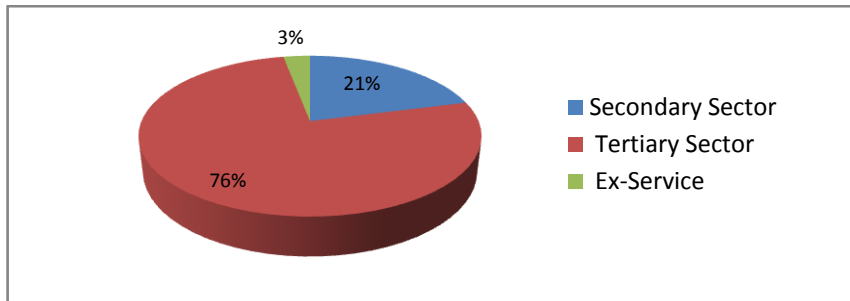


Fig. 2: Occupation Characteristics

The majority or three-fourth of the population belongs to tertiary sector i.e. 76%. They are generally in government/ public sector jobs and are much more in numbers as compared to the people in secondary sector in each income groups as evident in the Fig. 3.2. The people belonging to secondary sector constituting 21% of the total are generally the businessmen, shop owners. The non working/ retired people from the government sector receive pension constitute only 3% of the total surveyed population.

3.2. Level of infrastructure facilities in the study area

The infrastructure facilities included in the survey area are the ones located in the residential areas like water supply and not the ones which are not located in the residential areas, though used by the residents daily, for eg., transportation services.

3.2.1 Housing :

Housing is considered to be one of the very important parameters to be considered for assessing the performance of the infrastructure facilities.

The apartment culture is also spreading in Jaipur at a fast pace, but still haven't covered enough sprawl of the area and hence, most of the structures in the study area are G+1. In the study area, both public and private sectors are involved in the housing sector to cater the demands of various segments of the society, though most of the surveyed houses are constructed by Rajasthan Housing Board (RHB). It generally provides housing for the middle income, lower income and especially economically weaker sections of the society. Urbanization in the city has added pressure on the existing supply of housing. The presence of various educational institutions in the study area has attracted a large amount of student

population and has created more demand for housing. Also, rapid growth in secondary sector and tertiary sector is causing in-migration of skilled human resource in the study area.

3.2.1.1 Housing Characteristics The housing characteristics of the study area include the condition of the houses of the surveyed households and the developer of the plot as represented in the Fig. 3 and Fig. 4. This is necessary as the level of the physical infrastructure facilities provided in the residential sector depends hugely on the developer of the land.

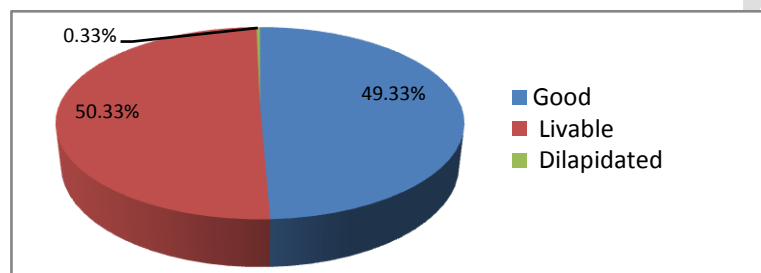


Fig. 3: Condition of the house

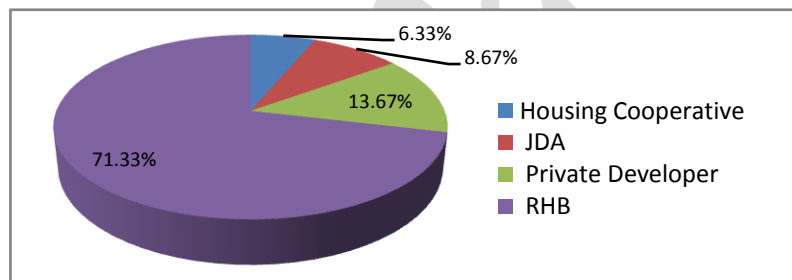


Fig. 4: Developer of the plot

As evident from the above figures, most of the houses in the survey are constructed by RHB and in average condition. The RHB being a public agency takes care of the provision of infrastructure facilities to a great extent.

3.2.2 Physical infrastructure facilities in the study area The further details of the households regarding the water supply, sewerage system, drainage system, etc. have also been surveyed. The quality of the services including water supply, sewerage, street lighting, etc. is presented on the basis of the personal opinions of the residents.

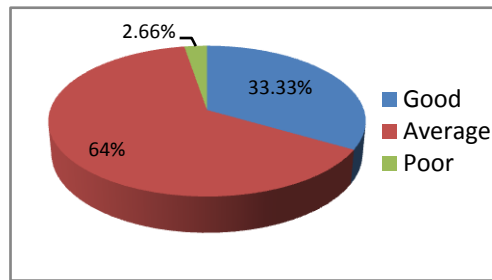


Fig. 5: Quality of water supply

In the survey area, almost everyone has access to the municipal water supply. But the Fig. 5 clearly indicates that the quality of water is a bit questionable as well as the supply hours are very less considering the needs of the residents.

People have rated the quality of the sewerage and drainage services as either good or average as illustrated in Fig. 6 and 7. The problems of clogging, overflowing in the drains are rampant in most of the houses, especially in the ones built by housing cooperatives with open drains.

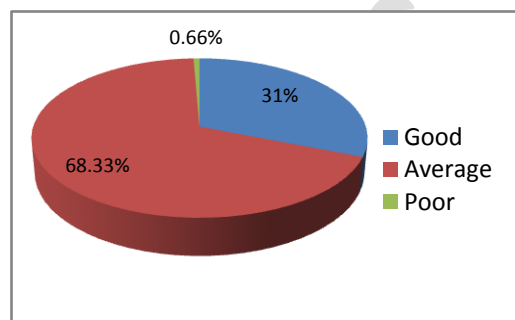


Fig. 6: Quality of Sewerage

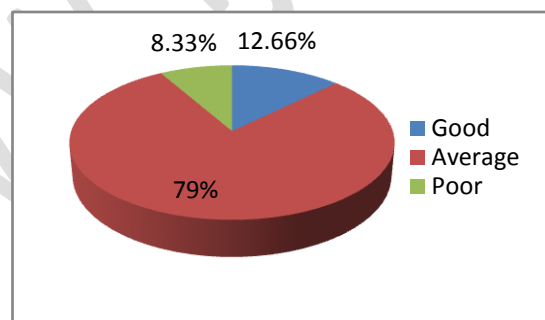


Fig. 7: Quality of Drainage

The problem of ill maintenance and lack of cleanliness has become a very usual characteristic of our Indian metropolitan cities. Our cities have gained a notorious reputation for being unable to maintain a hygienic and clean environment for the people.

Furthermore the issue is complicated by the lack of open spaces, pollution, etc. In the surveyed area, the houses or the colonies constructed by the public agencies have taken care of the open spaces, parks, playgrounds, etc. but the private developers generally tend to

ignore the non-profit making facilities for the residents. Similarly, the housing colonies where housing cooperatives have been active, lack most of the infrastructure facilities. The quality of access road and street lighting is poor in most of their areas just like the case of drainage and sewerage. Fig. 8, Fig. 9 and Fig. 10 indicate that the services which define the quality of a locality or a residential colony like access roads to the houses, street lighting, etc are not taken care of.

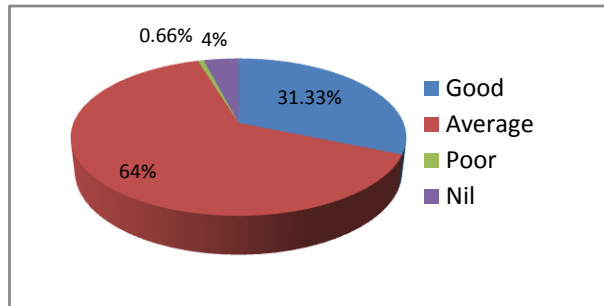


Fig. 8: Quality of Open space

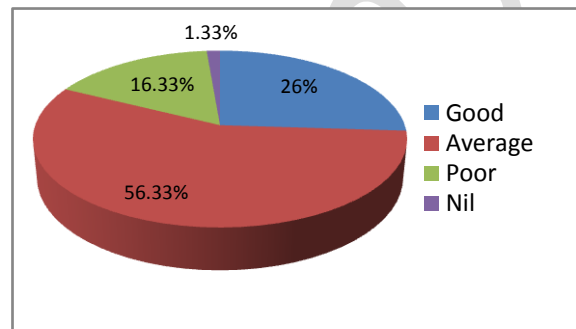


Fig. 9: Quality of Access Road to the house

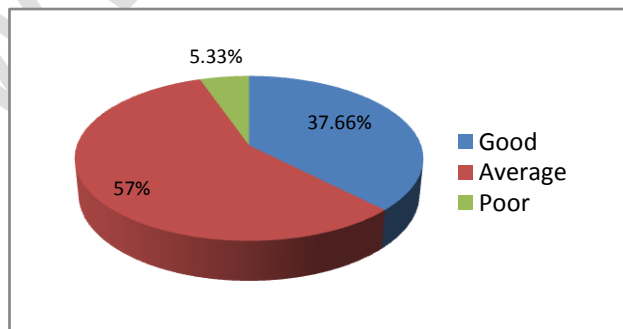


Fig. 10: Quality of Street lighting

Finally, the environmental aspect was assessed in terms of pollution and safety due to the increasing levels of air pollution in the city and rise in the number of crimes in the past years.

Most of the residents i.e., a bit less than half of the people, rated the environment as poor because of the air pollution which is increasing day by day consisting of suspended particles and carbon due to increasing number of personal vehicles as well as public transport (Fig. 11). The norms set by the Rajasthan State Pollution Control Board to keep a check on the pollution generated by the vehicles are decades old. The people with respiratory ailments face problem during winters when the air is thicker as compared to other seasons. Comparatively, in terms of safety for women and children people find the city a little bit better (Fig. 12) though the city has slowly started losing its reputation for being safe.

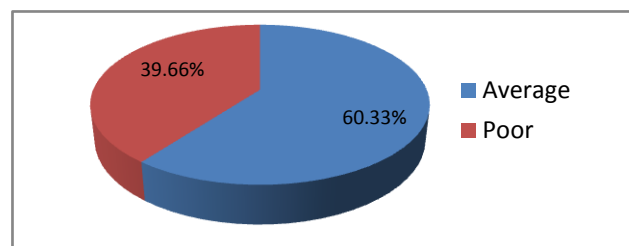


Fig. 11: Quality of Environment in terms of pollution

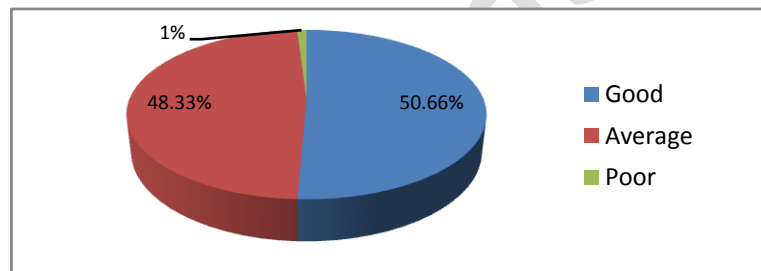


Fig. 12: Quality of Environment in terms of safety

4. ANALYSIS OF THE DATA USING WEIGHTED INDEX METHOD

Weighted Index Method has been applied here to find out the performance of the various infrastructure facilities in the study area. This method is used to analyze the parameters to find the order of priorities on which they influence the various parts of the study area. To apply this method, achievement of each infrastructure parameter has been assessed in terms of percentage performance where data could be objectively analyzed. Subjective weightage has been given on the basis of the results of the household survey conducted in the study area, based on the observations made and the discussions held with the residents. This is done by assigning the highest weight to the best level of service and the lowest to poor level of service of individual infrastructure in the system. At the outset, a quantitative value has been given to

them. The weighted index is calculated by employing a three point scale ranging from 0 to 1.0 (points with 0, 0.33, 0.67 and 1.0) with equal variation in the order of ranking such as 0.33 for the lowest ranking, 1.0 for the highest ranking and 0 for the absence of the infrastructure parameter in the individual case.

The formula used for calculating the weighted average is:

$$\bar{x}_w = \frac{\sum_{i=1}^n (w_i x_i)}{\sum_{i=1}^n (w_i)}$$

where

\bar{x}_w is the weighted mean variable.

w_i is the allocated weighted value.

x_i is the observed values.

The values of the weighted indices are presented in the Table 4.1.

Table 4.1: Weighted average values of the infrastructure parameters

	Parameter	Weighted Average
1.	Physical condition of the house	0.75
2.	Water supply	0.77
3.	Sewerage	0.77
4.	Drainage	0.68
5.	Open space	0.74
6.	Access road	0.69
7.	Street lighting	0.78
8.	Environment in terms of pollution	0.54
9.	Environment in terms of safety	0.83

5. CONCLUSION

It can be manifested from the above table that the people are dissatisfied the most with the services of the solid waste management and the facilities for maintaining the cleanliness in their areas. And same goes for the amount of pollution in the environment of Jaipur. People are dissatisfied with the increasing levels of air pollution and the degraded water quality.

Moreover, the quality of the infrastructure provided by the public sector is satisfying at a certain level, though they are not able to reach all the sections of the society and in each area of the city.

This concludes that the government needs to focus its attention on the solid waste management and cleanliness along with pollution in the city if it wants to project itself as a world class city. Moreover, tourism, especially international tourism, is contributing majorly in the State's economy and these issues tarnish the image of the city on an international platform to attract tourism. Also, the city has attracted a lot of investment from private developers in the past years creating a boost in the economy and hence giving rise to major projects. The inefficiency of the government to tackle these issues can act as a deterrent for the investors to invest in the city. The government also needs to combat the problem of inefficiency in institutional management to be able to provide the basic facilities to the residents.

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