

Public Health Engineering: A Social Assessment of Urban Infrastructure in North Karnataka

Dr. S. Shrinivas, Seenivasa K N

*Assistant Professor, Department of Studies in Sociology, Government First Grade College,
Hukkeri, Belgaum*

Research Scholar, Department of Sociology, Bangalore University, Bangalore, Karnataka, India.

ABSTARCT: *Improvement of the town is determined on the basis of rapid urbanization, population growth, expansion of existing services and creation of new infrastructure amenities. Infrastructure facilities such as water supply, sanitation, road, drains, power supply, parking etc., are essential for the development of socio-economic conditions of the town. To this day, these facilities are lacking in a number of urban areas in India. Subsequently, this will have a major impact on health, economy and social life of the society. The analysis on underground drainage facility indicates that in Badami and Belgaum, 70 percent of the respondents showed a positive interest, whereas in Ilkal it was almost 40 percent. The soak pits can be suggested but the possible threat of water clogging during monsoons makes it unadvisable as it will have an adverse impact on the health of the society. Therefore, the engineers should conduct IEC programmes in cities regarding the benefits of UGD. As per the on-field information available, the poor maintenance of open drainages was found in all the towns making it unhygienic. The problem to mosquitoes and air pollution is bound to result in the spread of communicable diseases such as viral fever, malaria and cholera etc. Therefore it becomes imperative on the part of the ULB has to take necessary steps for proper maintenance of open drainages.*

I. INTRODUCTION

Improvement of the town is determined on the basis of rapid urbanization, population growth, expansion of existing services and creation of new infrastructure amenities. Urban infrastructure consists primarily of residential and commercial space, supported by an array of services such as: adequate water supply for drinking and other uses; drainage sanitation and sewage systems; utilities such as electricity and gas distribution; adequate road, rail and water-borne urban transport and parking both public and private; primary as well as sophisticated secondary health care services that caters to all segments of the population; primary, secondary and tertiary educational facilities; and environmental regulation. The sound provision of urban infrastructure is intimately linked to decentralization of economic and political powers to sub-national tiers of government, which flows from the 74th Amendment to the Constitution. There is a need to create fully empowered city government to manage the urbanization process, while having political and financial accountability for it.¹ To this day, these facilities are lacking in a number of urban areas in India. Subsequently, this will have a major impact on health, economy and social life of the society. As per the 2001 Census, 285.35 million people reside in urban areas constituting approximately 28 per cent of the total population. It is estimated that the share of urban population may increase to about 40 per cent of the total population by 2020-21.²

II. HISTORICAL BACKGROUND OF THE STUDY AREA

The place Belgaum is located in northern part of Karnataka. The study has been conducted in three places namely Belgaum, Badami and Ilkal

Belgaum

Belgaum city is a district and divisional headquarters. It is located 510 km from Bangalore and 96 km from Hubli. Classified as a City Corporation (CC), Belgaum's population has increased from 369,177 in 1991 to 399,600 in 2001, at a compound annual growth rate (CAGR) of 0.80 percent. Popularly known as the 'Cradle of Infantry'. Belgaum houses defence establishments such as Military Training Centre and Air Base, besides major industrial establishments such as Tata Power and Indian Aluminium (INDAL) factory. The city Corporation's jurisdiction extends up to an area of 94.08 sq. km, housing 3.99 lakh population within 58 wards. The industries, educational institutions and the defence establishments significantly contribute to the economic growth of the city.

The city is situated in 15° 51' North latitude and 74° 31' East longitudes, at an altitude of 710 m above mean sea level (MSL). The town is well connected with national highways (NH4, NH4A) and state highways Vengurla-Bagalkot.

ILKAL

Ilkal is situated in Hungund Taluka of Bagalkot District. The town is located on Solapur-Chitradurga Highway (NH-13). Classified as Town Municipal (TMC), Ilkal's population has increased from 40,101 in 1991 to 51,920 in 2001, at a compound annual growth rate (CAGR) of 2.62 percent. It is an important educational, commercial and industrial town in the district. Ilkal is known for its handloom saris known as 'Ilkal Saris' and pink colored granite stones. The town has an ancient Mutt of Sri. Vijayamahanteshwara and Dargah of Sufi Saint Syed Hazarath Murtuza Khadri. The town is located at 15° 57' North latitude and 76° 07' East longitude, at an altitude of 563 m above mean sea level (MSL). The town is well connected with national and state highways (SH6). The nearest railway station is at Bagalkot, 60 km from town. The town falls under semi-arid region with salubrious climate. The maximum temperature is experienced during the months of April and May. However, during winters, the temperature falls to around 29° C, which makes pleasant to reside. The mean annual maximum and minimum humidity recorded are 33.4° C to 20.33° C respectively.

BADAMI

Badami is a taluka headquarters and an important tourist place located in Bagalkot District. The town has located at a distance of 36 km from Bagalkot, 113 km from Bijapur and 520 km from Bangalore. Badami, Aihole and Pattadakal (UNESCO promoted World Heritage Site) are the most important site of archaeological and historical interest in the country. With a population of 25,851, Badami is a Class III town. The town is divided into 20 administrative wards to manage urban services delivered by the Town Panchayat (TP).

The town is located at 15° 55' North latitude and 75° 40' East longitude, at an altitude of 690 m above mean sea level (MSL). The town is well connected with state highway 14. The town falls under the dry and arid zone in the State. The climate is characterized by dry weather in major parts of the year and very hot summer especially during the months of March to May. With the monsoon generally spread over six months, June to November, the average rainfall recorded in and around 600 mm. The maximum temperature is observed ranges from 38° C to 40.5° C during March to June, however the temperature falls to 14.6° C during December.⁴

III. THE SCOPE OF THE STUDY

The area of the study consists of Belgaum, Badami and Ilkal Cities. These places have been chosen taking into account the different civic bodies that they belong to. The Belgaum City comes under the City Municipal Corporation (CMC), while Badami comes under Town Panchayat (TP) and Ilkal comes under the Town Municipal Council (TMC).

IV. THE PROBLEM

The Research Problem of the present study constitutes "Public Health Engineer: A social Assessment of Urban Infrastructure in North Karnataka". Presently, most of the rural families are migrating to urban areas in search of livelihood and later they decide to reside permanently. They expect minimum basic needs, because in rural areas such needs cannot be fulfilled. The rate of migration from rural to urban area is too high; as a result the ULBs are facing the problem of providing the basic amenities to the society. This is a major problem and it is continuing at the city level, state level, national and international level. The urban areas will develop on the basis of infrastructure amenities available, if the urban areas are having poor infrastructure then it will have impact on the health of the society. The various projects are coming up for the development of infrastructure in rural and urban areas. The projects regarding the development of infrastructure facilities for rural areas are more compared to urban areas. Too many research studies have been conducted in urban areas in India, but only a few studies were made in North Karnataka. Taking this into Gap, I have selected the above said study, so that it will be helpful for the society on one side and on the other hand it will be helpful for preparation of master plan for infrastructure development.

V. THE OBJECTIVES

The following are the objectives of the study:

- To know the infrastructure status
- To know the environmental problems in the towns
- To apply public health engineering techniques

VI. THE METHODOLOGY

With the above objectives in the backdrop, I have carried out an intensive primary survey of households in all the towns. For conducting the social assessment survey of the households, the following methods were adopted.

Interview Schedule- The questionnaire had three components: first component delineate about socio-economic profile of household members; second component detail about existing practices carried with regard to water supply and sanitation and, about the status of solid waste management, sewerage and roads; third component capture about the views and perceptions of the households with regard to willingness to pay for the services rendered by the urban local bodies.

Site Visits- As part of the survey, using participatory methods like transect walk, site visits were made to land filling sites (garbage disposal place), drains, community toilets, and streets, open defecation places and spoke to on-lookers and on-goers about the utility of the services.

Visual pictures- During our discussions with the professionals, senior citizens, visit to sites and group discussions, photos were taken to document the discussions and the status of civic amenities available in the respective cities and towns.

Collection of secondary data- In addition to the above primary data, the secondary data was also collected from the offices of Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC), the project consultants, city corporations, municipal councils and cities/towns. Documents like CLIP (City Level Investment Plan), Concept plans and Census were referred to use necessary data.

SAMPLE COVERED

The stratified sampling has adopted for the research study. The interview were conducted one higher, middle and lower class families.⁵ The total households selected in Belgaum is about 195 in all the wards. The stratified sampling has been adopted and in each ward one lower class, one middle class and one upper class households has been selected. Similar technique has been implemented in case of Ilkal where 84 households (28 wards) and in case of Badami 60 households (20 wards). These samples covered all the wards in the town.

VII. REVIEW OF LITERATURE

1. The objective of the Karnataka Municipal Reform Project in India is to help improve the delivery of urban services in Karnataka, through enhanced urban infrastructure, and improved institutional and financial frameworks at the urban local body (ULB), and state levels. To this end, the project components will: 1) support institutional development, by enhancing capacity building activities towards improved transparency and accountability at the ULB, and state levels in key areas, such as computerization, urban land management and planning, financial management reforms, training to ULB staff and technical assistance (TA) and training to relevant Government agencies' staff; 2) support municipal investment, through the provision of performance-based loans and grants to ULBs outside Bangalore for investments in urban services, covering water supply, urban roads, street lighting, slum upgrading, and other necessary municipal functions, such as solid waste disposal, sewerage, and storm water drains; 3) finance Bangalore development, supporting the rehabilitation of Bangalore city road network, the construction of a sanitary sewerage system in the eight ULBs around Bangalore city, and institutional capacity building of Bangalore Water Supply and Sewerage Board (BWSSB), and the construction of sanitation facilities at the community and individual levels in eight ULBs; and, 4) support project management, that is the project implementation, to include incremental operating costs of relevant implementing units, and a project development advisory facility to support the preparation and implementation of subprojects by ULBs.⁶

2. The Study of City Level Investment Plan constitutes (i) prepare a Master Infrastructure Development Plan; (ii) assess the status of stakeholders in terms of financial capability (including resource mobilization), based on available documents (annual reports/ balance sheets/ audited reports) and technical capability; (iii) prepare the investment and recovery plan for selected stakeholders in the towns/ urban agglomerations; and (iv) evaluate the benefits accruing/ accrued from the assets completed under various schemes, in terms of the benefits estimated in the respective DPRs. The CLIP reports will also cover aspects such as: (i) new projects and estimated funding requirement; (ii) prioritization and phasing of projects; (ii) financial plan; (iv) growth direction and potential areas; and (v) project management strategy.⁷

3. The objective of JalNirmal Project: (i) To increase rural communities access to improved and sustainable drinking water and sanitation services and (ii) Decentralised service delivery through Gram Panchayats and user groups. In this regard they have conducted various awareness programmes regarding the usages of

water supply and sanitation in rural areas. They have also involved community in the investment, so that the operation and maintenance will be managed by the local residents.⁸

4. The study describes the rapid economic growth in the city of Visakhapatnam which is now one of India's largest ports and an important industrial town and seaside resort/retirement centre. It highlights how the city's further growth is constrained by inadequate investment in infrastructure - especially for water and electricity - and discusses the political and institutional reasons for this. It then presents the findings of participatory research on poverty, and the many dimensions of poverty which are emphasized by urban poor groups, including inadequate incomes, lack of assets ("no shelter, no property, no gold"), lack of support (especially for widows, deserted women and the handicapped), illness and debt. It discusses the direct and indirect impacts on poverty of a DFID slum improvement project, showing which improvements low-income groups particularly appreciated. This demonstrated the importance of infrastructure and service provision to poverty reduction within a wider recognition that this is but one important aspect.⁹

5. This paper analyses the recent trends and structure of urbanization in India, examines the validity of the projections made by various international and national organizations and discusses the implications of the concentration of demographic and economic growth in and around a few large cities. The availability of basic amenities such as water supply, toilets and electricity are analyzed across the states and size class of urban settlements, reflecting an accentuation of regional imbalances. The impact of tapping capital market through a credit rating system and the launching of innovative borrowing instruments by the local authorities are also examined. The author argues that the initiatives for a new system of governance are likely to result in a top-heavy urban structure wherein a few large cities would claim much of the economic activity. Furthermore, it is argued that the recent changes in urban governance, including the Constitutional Amendment, may not effectively empower the smaller bodies, particularly those in the less-developed states, to undertake development responsibilities. The basic contention is that the issues' concerning the hierarchy of urban settlements has not received adequate attention in contemporary development research. Given the wide disparity in economic strength of Third World towns and cities and their unequal access to capital market and public institutions, a liberal economic environment would facilitate a few large cities to corner much of the advantages from the system. The indifference on the part of the research community towards issues relating to urban structure is likely to institutionalise the existing inequality and accentuate regional imbalances.¹⁰

6. This article summarizes initial findings of a study to explore the potential of providing micro-financing for low-income households wishing to invest in improved water supply and sanitation services. Through in-depth interviews with more than 800 households in the city of Hyderabad in India, we conclude that, even if provided with market (not concessional) rates of financing, a substantial proportion of poor households would invest in water and sewer network.¹¹

VIII. SIGNIFICANCE

The Study of urban infrastructure has acquired a greater significance. The socio-economic development of any urban areas in the world is mainly based on the infrastructure amenities. In this regard, Government of India is putting their full effort for providing the basic facilities to society. The Government has taken various loans from World Bank, Asian Development Bank and other banks for satisfying the basic infrastructure facilities in urban and rural areas. The study "Public Health Engineer: A social Assessment of Urban Infrastructure in North Karnataka" gains relevance on various grounds such as water supply, sanitation, health etc. This study depicts the current status, requirements of the society and impact of poor maintenance about the infrastructure facilities. The findings of the study will be helpful for the sociologists, Engineer, Environmentalists, Government of India and voluntary organisation, which intend to introduce new developmental activities. It will be also helpful for ULBs to prepare action plan for the developmental activities in water supply and sanitation sectors.

IX. PROBLEMS PERTAINING TO INFRASTRUCTURE FACILITIES

As mentioned earlier, all the urban areas are facing several problems in the basic infrastructure facilities, which can be classified as water supply, storm water drainages, underground drainages, dust bins and roads.

Table 1.1: Problems of Urban in Infrastructure Facilities

City level Problems	Belgaum	Badami	Ilkal
Water Supply	40.78	26.32	43.56
Storm Water Drains	28.45	26.02	5.33
UGD	20.01	26.32	15.56
Dust Bin	3.35	0.00	9.33
Road	3.35	12.48	24.44
No Problems	4.07	8.87	1.78
Total	100.00	100.00	100.00

As seen from the above table 1.1 which is showing problems faced by the local residents pertaining to infrastructure amenities. More than 40 percent of the respondents in Belgaum and Ilkal town opined that, they have faced acute shortage water supply, while Badami town had less water supply problem. Around 30 percent of the respondents in Belgaum and more than 25 percent in Badami town replied that they faced the problem of storm water drains and the problem of storm water drainage was less in Ilkal town. The problem of road in Ilkal was more (24.44 percent) compared to other towns. The above table can be concluded that, their suffering is mainly on three elements such as water supply, storm water drains and road.

1. Types of Water Supply

Water supply supplied to households in different forms, which can be divided into four distinctive forms. They are individual piped water supply (Household Connections), Public Stand Post, Mini Water Supply and bore well/ hand pump.

Table 1.2: Forms of Water Supply

Particulars	Belgaum	Badami	Ilkal
Individual Water Connection	63.17	40.98	20.20
Public Stand Post	25.79	50.24	48.63
Mini Water Supply	1.93	2.44	8.73
Bore Well/Hand pump	0.32	2.93	14.96
Open well	7.96	3.41	7.48
Others	0.83	-	0.25
Total	100.00	100.00	100.00

The above table reveals the fact that the types of water supply existed in the town has been analysed. An average percentage of individual water connections found in all the towns were around 40percent. In Belgaum city it was more than 60 percent, which was high compared to other town. The less percent of individual water connection found in Ilkal town was about 20 percent. An average percentage of Public stand post facilities found in all the towns were about 42percent. The above information justify that majority of the percentage of families are depending on water supply from public stand post and also it justifies that all the three places are not having acute shortage of water supply.

2. Quality of Water Supply

Water quality is one of the significant elements for maintaining better living condition in the town. Water supply from the river should be treated before supplying. Several methods were adopted for the treatment of water. Keeping this as a background, a detailed household interview has been conducted about the satisfaction level of quality of water supply. The following table indicates the analysis of quality of water.

Table 1.3: Satisfaction level of Water Quality

Water Quality	Belgaum	Badami	Ilkal
Potable	91.93	62.98	60.00
Non Potable	8.07	37.02	40.00
Total	100.00	100.00	100.00

Analysis of satisfaction level of water quality in table 1.3, which indicates that, more than 90 percent of the respondents in Belgaum and more than 60 percent in Badami and Ilkal towns opined that they were satisfied with the quality of water supply (Potable) supplied by the ULB. The overall picture of the above table indicates that majority of the respondents' replies that the quality of water is potable. With the above analysis the weightage should be given to non-potable water supply because the most of diseases related to bad quality of water consumed by the family members.

3. Willingness to Have Ugd Facility

A detailed survey has been conducted about the requirement of Under Ground Drainage System in the town. Below table gives an analysis of willingness to have UGD system.

Table 1.4: Opinion on willingness to have UGD facility

Particulars	Belgaum	Badami	Ilkal
Yes	17.09	68.16	38.67
No	13.62	31.84	18.67
Not Applicable	69.29	-	42.67
Total	100.00	100.00	100.00

As seen from the above table, almost 70 percent of the respondents have shown their positive attitudes to have Under Ground Drainage System facility in Badami and whereas in Ilkal was almost 40 percent. With the above analysis, it is clear that most of the respondents willing to have UGD facility.

4. impact of poor maintenance of open drainage

Maintenance of drainages is important to improve better health conditions and plays a key role in the socio-economic and environmental status of the town. Keeping this as background, a detailed interview has been conducted with local residents.

Table 1.5: Perception about the maintenance of Existing Drainage

Particulars	Belgaum	Badami	Ilkal
Breeding of mosquitoes	34.67	45.32	21.24
Bad smell	41.36	-	6.98
Affects day to day life	15.60	12.73	14.11
Effects on environment	7.55	32.58	2.90
Spread of communicable diseases	0.83	0.75	9.54
No Problem	-	8.61	45.23
Total	100.00	100.00	100.00

As per the available information on the field, this indicates the present condition of drainages. More than 30 and 45 percent of the respondents in Belgaum and Badami towns said that the problem of mosquitoes were more due to poor maintenance of drainages in the town, where as 23.24 percentage of the respondents in Ilkal opined that they faced problem of breeding of mosquitoes. Bad smell found in Belgaum town was about 43 percent due to poor maintenance of existing drainages and whereas in Badami was nil. As a result of the above analysis, it indicates that the problems of mosquitoes and chances of communicable diseases are also more such as viral fever, malaria and cholera etc.

X. FINDINGS

- The acute shortage of water supply found in Belgaum and Ilkal
- The problem of storm water drainage found in all the towns
- The household connection of water supply are more in Belgaum compared to other towns
- The quality of water supply supplied by the ULB is potable and only in few cases is non potable, but the emphasis should be given to non potable water.
- The majority of the respondents have demanded the requirement of UGD facility
- Majority of the respondents complained about the poor maintenance of existing drainages.

XI. CONCLUSION

The overall study indicates that the infrastructure status, environmental problems faced by the society in the towns should be attended by the technical and non-technical staff of ULB. It is the social responsibility and professional commitment of the civic bodies to provide hygienic amenities to the community.

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