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Status of sanitation condition in Aligarh city: A challenge for smart city vision

[1] Mariya, [2] Dr. Fatma Mehar Sultana
[1] Research Scholar, Department of Geography, Aligarh Muslim University, Aligarh, Uttar Pradesh, India
[2] Assistant Professor, Geography, Women's College, Aligarh Muslim University, Aligarh, Uttar Pradesh, India

Abstract
Sanitation facility is one of the most important requirement for the healthy and clean environment. Sanitation does not mean only to clean sewerages but to protect those sources of water which support the sustainable development. Safe drinking water, solid waste management and good sanitation are the important measures for improvement in environment and quality of life of the people in the cities. In this direction to improve the city condition, Smart City Mission is an innovative and new initiative by the Government of India to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment. One of the core infrastructure element of Smart City Mission is sanitation and solid waste management through the development in effluent treatment plant, sewage and sludge treatment, waste treatment and recycling etc. The present study is conducted in Aligarh city which is the prime example of sanitation and sewerage problems and is the hub of diseases. The present paper tries to analyse the current parameters of sanitation, and also tries to evaluate that what are the targets for Aligarh city as a Smart City to tackle out these issues. The paper investigates the problem using primary as well as secondary data. Statistical technique of analysis and GIS technique for map making is used to present the results.

Keywords: Aligarh, sanitation, drainage, urbanization, smart city

Introduction

Urbanisation is a rapidly increasing process in the world. In our India nearly 31% of the India's current population lives in urban areas and contributes 63% of its GDP (Census 2011) [6]. Cities are the engines of growth for the economy of every nation. The process of urbanization brings numerous benefits for monetary growth, expansion of business activity, social and cultural incorporation, resourceful services. Urbanization also leads to some issues. Problems of urbanisation is manifested on lope sided growth and faulty urban planning. Hence India's urbanisation is followed by some basic problems in the field of: 1) housing, 2) slums, 3)transport, 4)water supply and sanitation, 5) water pollution and air pollution, 6) inadequate provision for social infrastructure (school, hospitals, etc) (Pranati Dutta 2006) [9]. One of the major problems faced by the urban areas is the problem of sanitation and sewerage conditions leads to many infectious diseases such as diarrhoea, malaria etc, particularly to the vulnerable group. Sanitation facility is one of the most important requirements for the healthy and clean environment. Sanitation literally means measures necessary for improving and protecting health and well being of the people. Sanitation is any system that promotes proper disposal of human and animal wastes, proper use of toilet and avoiding open space defecation (unicef 2008).

To improve the city condition, smart city Mission is an innovation by the govt. of India to promote cities that provide core infrastructure and give a decent life and a clean and sustainable environment to its citizens. Ministry of Urban Development, Govt.of India defines smart city as those which have smart (intelligent) physical, social, institutional and economic infrastructure. It is expected that such a smart city will generate options for a common men to pursue his/her livelihood and interests meaningfully. Under this project the government of India provided the core infrastructure facilities to the cities these are – Adequate and clean water supply, sanitation and solid waste management, efficient urban mobility and public transportation, affordable housing for the poor, power supply, robust I.T connectivity, E governance and citizens participation, safety and security of citizens, health and education, sustainable urban environment. Aligarh has been chosen under this programme as it is a industrial town which is economically significant and can diversify to enhance economic activities. The city has facing the serious problem of sanitation and sewerage which is the major hindrance in their developmental process. The main objective of the paper is to analyse the current parameter of sanitation, and also tries to evaluate that what are the targets for Aligarh city as a smart city to tackle out these issues.

Study Area

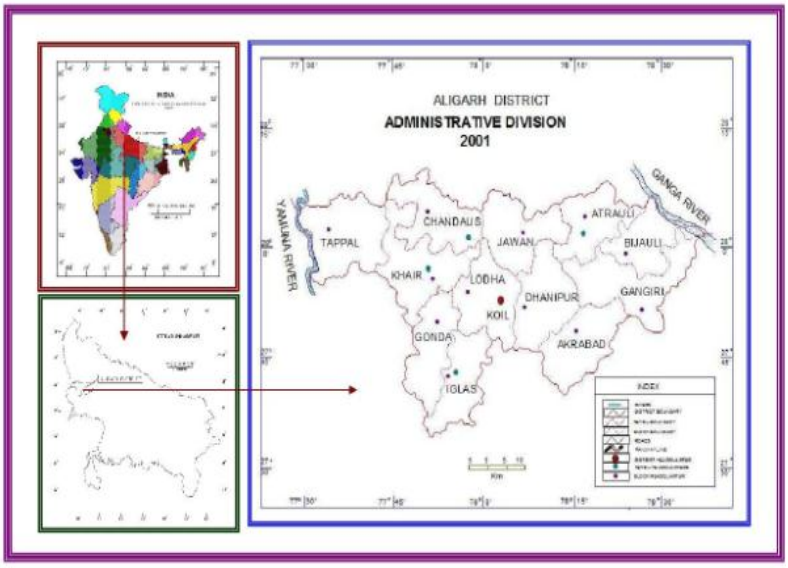


Fig 1: Aligarh district map

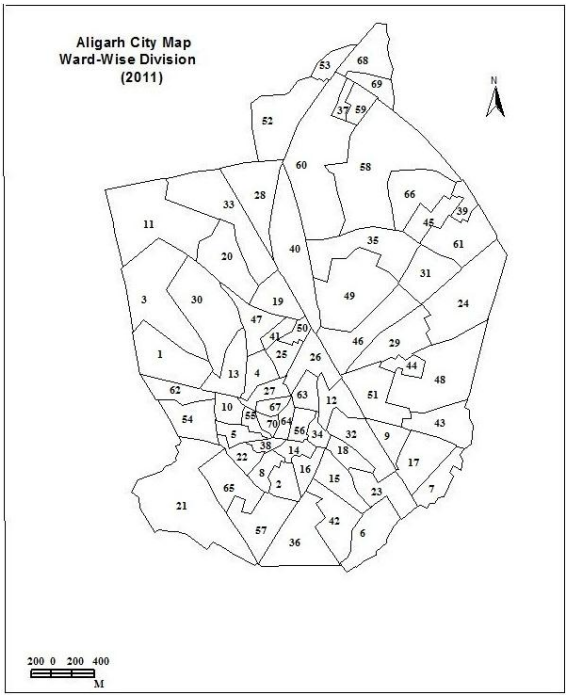


Fig 2: Aligarh city map

The present study is conducted in Aligarh city which is Class I city (Greater than 1,00000 population) as of the census 2011 of India, population of Aligarh district is 3,673,889. Aligarh is the important business center of Uttar Pradesh. Aligarh urban agglomeration has population of 909,559 and Aligarh Municipal Corporation covers a population of 872,575 in which 53 percent are males and 47 percent are females. The percentage share of urban population in the district is 33.1% as against 22.3% of population in urban areas of the State (census 2011). It is located at $27^0$4' East Longitude and $27^0$53' N Latitude, about 133 km away from the country's capital, New Delhi on the main railway route of Kolkata to Delhi, in the western part of the state Uttar Pradesh. The city covers an area of 36.7 sq km and subdivided into 70 wards, spread over 427 mohallas and has 147363 households (census 2011). Topographically the district represents a trough saucepan shape like depression and a broad low lying belt is found in the centre of the district with the city lying in the centre of this low lying belt. The drainage system of the city is defective, stagnant pools and flooding of low lying areas is quite part missing and Aligarh is the prime example of sanitation and sewage problems and is the hub of diseases.

Data base and Methodology

The present study is mainly based on secondary sources of data. the secondary data is collected from different sources as Aligarh municipal corporation (2010), census of India (2011), apart from it, the sanitation environment of the city is gathered from Urban Health Initiative (UHI)- Aligarh city profile-2010, the data collected were organized, tabulated, and the result were analyzed with the help of statistical techniques. For the data analysis, tools of analytical statistics were applied. For the analysis of sanitation conditions in Aligarh city - Z-score statistical technique was used. This method was applied to transform raw data of each variable into a standard score.

Z-score technique is expressed in the form of an equation.

$$Zi = \frac{xi - x}{sd}$$

Where,

Zi = standard score of Ith variable

xi = original value of the individual observation

x = mean of variable

sd = standard deviation

Further the results of the standard score obtained from different indicators were aggregated by composite standard score that will indicate the level of sanitation development in the city. This may be expressed as:

$$CSS = Zij/N$$

Where,

CS = composite mean Z score

Zij = Z score of variables

J = in observation

N = number of variables

In order to classify the districts to their level of development on the basis of composite score, have been classified into three levels of development, High (the value of high ranges from above +0.50) medium (ranges from -0.50 to +0.50) low (below -0.50).

Limitation of the study

Due to lack of fast-hand data, it is not possible to cover all the aspects of sanitation in the study area. Data that covers the sanitation development in the present study is taken from the Aligarh Municipal Corporation and it is very limited to

present only drainage system of the study area. The drainage condition of the city is represented by number of open drainage, number of closed drainage, no drainage facility in the ward and total drain length of the wards in the city as provided by the Nagar Nigam of the city.

Result and Discussion

Status of sanitation condition in Aligarh:

The total length in the city is 1374.25 km of length. There are 50 large drains of 68.33 km of length with small drains of length 1276.92 km.

Table 1: Length of open drains in Aligarh city 2010

Types of drains	Length (Km)
Cemented drains	1374.25 (68.77 km big drains and 1276.92 km small drains)
Non cemented drains	50
Storm water drains	100

Source: Aligarh Nagar Nigam 2010

The condition of the proper drainage in the Aligarh city is very pathetic due to the bowl shaped topography, the waste water collects from the upper areas gets deposited in the low lying areas. The drainage system of the city totally depends on the pumping station. There are 5 main drainage/pumping station.

Table 2: Pumping Station of the Aligarh city

Pumping station	Serving areas
Iglas road pumping station	This is important station of the old city. Railway Godown to G T Road, Agra road, Big drain to Sasni Gate and Khair bypass depend on this station. This station has not been made to meet the need sof the rainy season therefore water logging occurs at many places
Charra Adda pumping station	This pumping station serves the areas of Civil Line like Ramghat road Gurudwara road, Mathura road, Marrisroad, Samad road. Lekhraj Nagar, Begumbagh, Sudamapuri and Vishnupuri. This station facing the same problem as the Iglas Road pumping station
Gular road pumping station	The old areas like Gular road, Delhi Gate, Khairroad, Kanvariganj, Udaisingh Jain road, radhuveerPuri, SaraiLavaria, Mitra Nagar, Ashok Nagar, Railway road, Sarai Hakeem, Dhapra road, Lakshmi Puri, Sarai Rahman, Rasalganj are covered under this station
Sarai Rahaman pumping station	This station has been made to reduce the load of Gular road pumping station. Ther fore, services are provided to the areas of Sarai Hakeem, Railway road, Sarai Rahman, Rasalganj, SaraiLavaria, NaiBasti, Anona House, Tasveer Mahal, Malkhan Nagar
Sewerage and drainage AwasVikas Jail Road	This station provide services to Awas Vikas colony, Masoodabad, Jail Road, NaiBasti, Basti behind Gagan School, ITI Road

Most of the pumping station mention above in the table 2. are obsolete and out of date and also fall short in providing services to the city due to large growing population.

Sanitation development in Aligarh city

To examine the status of the sanitation condition, the four important factors are taken into consideration to assess the overall sanitation condition in the city, these are i) number of closed drainage ii) number of open drainage iii) no drainage facility iv) total drain length of the wards.

Table 3: Sanitation Development in Aligarh city, 2011

Level of Development	Composite mean Z score	No. of Wards (%)
High	Above +0.17	14 (20)
Medium	-0.17 to +0.17	28 (40)
Low	Below -0.17	28 (40)

Based on these four indicators which are discussed above, three level of sanitation development on the basis of composite mean z score discussed are as follows:

1) High level of sanitation development

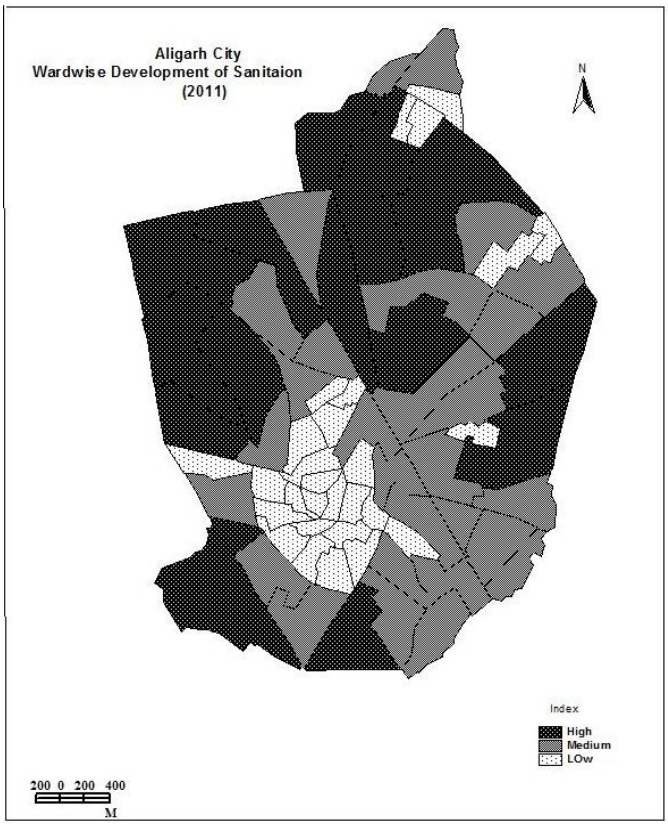
In this category of high level of sanitation development only 14 wards out of 70 wards i.e only 20 percent wards found to be made position in this category of development and this present a very serious situation of sanitation condition in the city and there is a need to find some appropriate measures to solve the problem of the drainage. These 14 wards present a good picture of sanitation and having good drainage condition. These are mostly the areas belongs to North Western and North Eastern part of the city mostly of suburb or industrial areas and civil line area or the areas which are newly developed. Slaughter house and University area ranks at the top position among all the wards with +1.42 and +0.79 score respectively.

2) Medium level of sanitation development

There are 28 wards under this category these wards have a good drainage condition. These are the areas of mostly civil line area but some areas belongs to old part and facing problems in drainage system.

3) Low level of sanitation development

There are 28 wards out of 70 wards i.e 40 percent wards of the city fall under this category characterized with very bad condition of drainage system. These areas belong to the South Western part of the city mostly of core areas and very congested part of the old city. These areas are facing the problem of stagnant drains due to congested market, congested narrow lanes and lack of irregular cleaning in the residential areas. Kalamahal and Baniyapara with the score of -0.32 ranks lowest position among all the wards of the city followed by Jamalpur, Shivpuri, Sarai Pakki, Rasalganj and Usmanpara with -0.31 and -0.30 scores respectively.



The highest composite mean Z score value of 1.42 is scored by Slaughter House (high sanitation development), followed by University ward with the Z score value of 0.79. Whereas the lowest value of -0.32 is scored by Kalamahal and Baniya Para. The overall finding reveals that the peripheral areas of the city and the civil line areas are the areas of good sanitation condition where as the core areas and the old part of the city represents bad sanitation condition. One of the major factors responsible for the overall bad drainage condition of the city is its topography that represents a shallow trough saucepan shape like depression with the city lying in the centre of the low lying tract. The city and its peripheral areas not only submerged during the rainy season but also remain submerged all year round because of poor natural drainage. It is very difficult task to improve the natural drainage. The reason behind the better sanitation condition in the peripheral areas is that these are the areas belongs to the sites of newly constructed houses and having a advantage of technological advanced drainage system as comparision to the core areas that represent a picture of bad drainage due to outdated drainage system, congested narrow lanes and congested market area.

Conclusion and suggestions

The overall sanitation condition in the city is very pathetic as most of the wards are confronted with the problem in drainage system. The problem in drainage system is due to the bowl shaped topography of the city, as water gets deposited in the low lying areas. The sanitation condition of the city is very worst as only 14 wards holds position in the high level of sanitation development. Wherein the Slaughter House ward and the University ward ranked top position with highest z score in overall sanitation development. Those areas that made position in high level of development mostly belong to the peripheral and civil line area of the city. The situation becomes worst when 28 wards of the city held position in low category of sanitation development. These areas are mainly the core areas or the old part of the city, that are characterized by the congested market areas, narrow congested lanes and irregular cleaning activities. Kalamahal, Baniya Para, Jamalpur, Shivpuri, Sarai Pakki, Rasalganj and Usman Para all these are the areas of congested, populated markets ranked lowest in overall sanitation development.

Suggestions: "Smart City Mission"- a solution for better Sanitation Development in Aligarh City

Among the various urbanization initiatives, the "Smart City Mission" is one of the major innovative measures by the Government of India for the betterment of the cities. The objective of this initiative is to accelerate core infrastructure improvements in cities to provide a decent quality of life to citizens, a clean and sustainable environment. The smart city mission broadly permits three strategies for smart development in a sub region of the city: 1) retrofitting (the improvement of existing areas, 2) redevelopment or city renewal including replacing existing built up areas and the co creation of newly layout areas with improved infrastructure, 3) green-field development (city extension to outgrowth areas). The State (UP) government has sent out a list of 13 cities to the government of India for development as "Smart Cities". Aligarh has made the position as one of the smart city under the guideline prescribed by the government of India. Aligarh city presents a very pathetic condition in overall sanitation development. The city suffers from poor municipal infrastructure facilities, poor drainage, sewerage, discharge of untreated industrial effluents, and insanitary conditions etc. The city condition in overall sanitation development needs improvement. The city needs cleanliness with 100 percent MSW collection, 100 percent collection of sewage, clean and functional storm water drainage and sanitation. Under the Smart City Mission, the Govt. of India provided the some influential measures to tackle out the issues related to the problem of sanitation. They provide basic services such as water, sewer, solid waste management and storm water drainage, bathroom cleaners, effluent treatment plants, lavoratories, sanitizers and disinfectants, sewage and sludge treatment as one of the better solutions for the betterment of citizens for a good and healthy living through improvement in sanitation condition of the city.

References

1. Aigarh Nagar Nigam (Aligarh Municipal Corporation) Sewa Bhawan, Aligarh, 2010.
2. Aligarh city profile. http:/ www.uhi-india.org. Feb, 2010.
3. Aligarh Smart city Draft Proposal. http:/ www.nnaligarh.com, 2015.
4. Azam SF. Irrigation and Agriculture Development, B.R. Publishing corporation, New Delhi, 1998.
5. Building Smart cities in India. http:/ www.brookings.edu. 2016.
6. Census of India, 2011.
7. City Sanitation Plan, Nagar Nigam Aligarh, 2010.
8. District Census Handbook Aligarh, 2011.
9. Dutta P. Urbanisation in India, European Population Conference, 2006.

10. Huggi SS, Problems and Challenges of Urbanization in India: A Sociological Evaluation, International Multidisciplinary Research Journal. 2015, 2(8).
11. Ministry of Urban Development, Smart City Mission "New Delhi": Government of India. http:/ smartcities.gov.in.
12. Singh AL. Abbas MZ, Planning for Water and Sanitation in the Residential Suburbs: the case of Aligarh city, India, Journal of Water, Sanitation and Hygiene for Development, 2014; 4(1).
13. Singh AL, Rahman A, Drainage problems in Aligarh City, The Geographical Journal, 1998; 73(1):35-40.