

## Impact of Urban Waste Management on Public Health and Role of AMRUT Scheme: A Study Of Jammu & Kashmir, India.

Rubaya Akther ,Danish Gulzar , Muzafer Rasool.

### Abstract

#### Introduction

Public health lies at the heart of governance reforms under the United Nations Sustainable Development Goals paradigm. Littering of urban waste results in stinking of public spaces, increased dog bite cases, water pollution, air pollution and several vector-borne diseases.

#### Aim & Scope

The study aimed to explore impact of urban waste management strategies on public health in the Union Territory of Jammu & Kashmir-India, and analyze the mediating role of AMRUT scheme in augmentation of waste management services and subsequent public health services in the region.

#### Research Methodology & Techniques

The paper is based on public survey involving 50 research respondents from general public and key stakeholders, and analysis of data gathered by questionnaire method and secondary data. The primary respondents for the present study included 30 members from general public, 05 senior academicians from university of Kashmir and university of Jammu, 05 eminent journalists and 10 officers from various district administrations. 1-5 Likert scale has been used to analyze primary data and reveal results for the study.

#### Results and Findings

The results reveal that mean value for public satisfaction was obtained as ( $\mu=2.0$ ), which reveals that research respondents are least satisfied with the accessibility, affordability and quality of urban waste management and sanitation services in Jammu & Kashmir. The findings also highlight skewed implementation of AMRUT scheme visa vis facilitation of effective waste management strategies, and significant positive correlation between waste management and public health and social wellbeing.

#### Conclusion

Availability of optimum waste management, sanitation and public health services, forms core of an urban development plan. Developing countries, like India, need to emphasize adoption of best waste management mechanisms and formulation of area based development strategies. The regions such as Jammu & Kashmir, having world famous tourist destinations and natural landscapes, need to provide optimum global tourism infrastructure and standards of life quality for citizens and visitors. Public health, public safety and public hygiene, must be incorporated as prime objectives of urban development planning, to ensure inclusive and sustainable development.

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#### Introduction

The emerging paradigms of development policy in the 21st century world, have been sustainability, inclusivity, equitable development, environment protection and public health, more so due to the recent

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#### Keywords

Public Health, Well-being, Waste Management, AMRUT, Jammu & Kashmir

COVID-19 pandemic which once again re-emphasized importance of people-centric development approach to ensure public safety, public security, public hygiene, public health and social well-being. Due to ever increasing urban population and subsequent scarcity of basic resources as well as other development concerns in cities and towns, the United Nations impressed upon all the countries to adopt sustainable urban development mechanisms as enunciated under the Sustainable Development Goals (SDGs) Framework. These sustainability advisories from the global body, also included procedures and pathways to achieve effective management of urban waste, to promote urban hygiene and urban living standards. The SDG goals- Good Health and Well-Being (SDG-3), Clean Water and Sanitation (SDG-6), and Sustainable Cities and Communities (SDG-11), explicitly provide impetus towards correlation between public health and need for effective waste management/ sanitation, especially in urban regions.

The major public health concerns associated with urban waste management, include air pollution, water pollution, noise pollution, vector borne diseases such as- tuberculosis, dengue, diarrhoea, Zika & Ebola viruses etc. World Health Organization (WHO) has divided these urban health concerns into three key domains- increase of non-communicable diseases, threat of outbreaks of infectious diseases and enhanced quality of various urban waste management, sanitation and drainage services in Jammu & Kashmir.

S.No.	Types of Urban Waste	Areas of Waste Production	Sources
1.	Food waste, plastics, paper, construction waste	Households	Residential Areas
2.	Leather, wood, aluminum, glass, horticulture & agriculture waste, tree leaves, metallic and electronic waste	Apartments	Residential Areas
3.	Paper, plastic, food waste, glass, metal, cardboard, wood, hazardous waste etc.	Shops, Offices, Restaurants, markets, printing houses	Commercial Areas
4.	Street waste, common waste of parks, tree pruning, beaches, clubs	Landscaping, waste water channels, cleaning streets, parks	Municipal Areas
5.	Industrial Process wastes, nonindustrial waste, damaged equipments, demolition waste, food waste, hazardous liquid wastes	Water channels, waste water channels, industry processes	Industrial Areas
6.	Garbage, Ash, Rubbish, Animal feces, human wastes	Households, Apartments	Residential Areas

### Review of Literature

The concepts of urbanization, waste management, urban sanitation, quality of urban life and challenges of public health in cities and towns, have received increased attention and focus over the years by academicians, researchers, clinical experts, urban planners and administrative practitioners across the globe, more so due to increased health consciousness in post COVID-19 pandemic world.

Rapid growth of urban population, paced urbanization, dynamism of food consumption patterns, and

haphazard development of industrial zones, have led to immense increase and diversified production of solid and liquid wastes in cities and towns [1]. Restriction on urban pollutants, including that of solid and liquid waste, is an essential component of an effective waste management protocol that lies at centre of modern science and technology disciplines according to the public health and economic principles [2]. Municipal solid wastes are very diversified both in terms of sources of production and in terms of physical and chemical properties, such as waste from domestic, industrial, commercial, health, transportation, and service sectors [3]. Therefore, sound knowledge of types of solid waste, its production sources, composition and intensity of production, is critical to design and develop effective solid waste management components and managerial performance [4].

Accumulation of waste in and around cities and towns, having proper moisture and nutrients, is a good shelter for carriers of infectious diseases, and leads to intense microbe growth, as well as generation of rats and insects, giving rise to huge number of diseases like trachoma, diarrhea, typhoid fever, tuberculosis, cholera, anthrax and plague. Few diseases due to rats include plague and typhus fever. Leptospirosis occurs due to food contamination and water contamination with an infected rat. Rats also indirectly facilitate transmission of several diseases like Taenia, amoebic diarrhea and Trichinella [5]. Environmental sanitation is a vital determinant of a quality lifestyle. It includes

safe disposal of human waste, solid waste management, waste water management, domestic cleanliness, personal hygiene, proper water supply etc. [6]. Environmental Sanitation also encompasses better provisions for access to a toilet facility as well as connectivity to an impactful drainage system. Approximately 37 percent of the world's population due to lack of ample services for toilets and sanitation, defecates in the open [7].

Dangerous synthetic materials, that are released to climate due to several natural and anthropogenic activities, cause adverse impacts on public health, human wellbeing and the environment. Increased use of petroleum derivatives led to huge release of air toxins, such as Carbon monoxide (CO), Nitrogen oxides (NO<sub>x</sub>), Sulfur dioxide (SO<sub>2</sub>), Ozone (O<sub>3</sub>), heavy metals, and particulates (PM<sub>2.5</sub> and PM<sub>10</sub>). As such, environmental pollution, including urban waste and poor sanitation, has intense and consistent adverse impacts on human health and wellbeing, influencing various organs such as respiratory discomfort, cardiac illness, acute bronchitis in youngsters and asthmatic assaults, which often result in unfortunate mortalities [8].

### Objectives of the Present Study

1. To analyze impact of urban waste management on public health in Jammu & Kashmir
2. To explore the role of AMRUT scheme in promotion of urban waste management in Jammu & Kashmir
3. To identify challenges of urban waste management and urban health in Jammu & Kashmir
4. Data Sources and Research Methodology

The study used both primary and secondary data sources, and is based on analysis and interpretation of data collected through a public survey conducted in different districts of Jammu & Kashmir, especially the districts of Anantnag, Srinagar and Jammu, using simple random sampling technique & questionnaire method. The study sample comprised of fifty research respondents including general public, academic experts, eminent journalists and officers from respective municipalities & district administrations.

Also, significant secondary data sources, including research publications, articles, government reports, books and websites, were consulted to evaluate various facets of urban waste management, sanitation, impact of urban waste on human health, and emerging challenges/ constraints for effective waste management and sanitation, with emphasis on analyzing impact of AMRUT mission on promotion of waste management practices and life quality of urban population in Jammu & Kashmir.

#### Results

The study results and findings, explored after comprehensive analysis & interpretation of both the primary data collected from the aforementioned fifty research respondents as well as research data from secondary sources, are discussed below:-

#### Impact of Urban Waste Management on Public Health in Jammu & Kashmir

As per 2011 socio-economic census, almost 30% of 13 Million population of Jammu & Kashmir, lives in urban areas, mostly in congested urban clusters and poorly developed cities' peripheries. The ever increasing urbanization trends in Jammu & Kashmir, particularly in last few decades, along with immense growth of urban population and persistent immigration of rural population towards urban regions, has not only led to housing congestion and scarcity of basic resources in urban regions of the Union territory, but also affected quality of public health due to poor waste management and sanitation services. The unplanned mushrooming of new urban colonies, lacking vital urban facilities such as roads, electricity, drinking water, waste management, drainage services, public parks and green spaces, have become hot beds of infectious diseases, due to littering and open disposal of solid and liquid waste, as well as filthy roads and lanes because of abject drainage networks.

During the public survey, it was observed that the socio-economically disadvantaged groups of urban population are mostly affected, and particularly those

living in cities' peripheries of Srinagar and Jammu districts, due to lack of household toilet facilities, poor waste management and insufficient drainage services. These slum areas facilitate growth of rodents, microbes and insects, that act as carriers of several vector borne diseases such as tuberculosis, dengue, diarrhoea, cholera, taenia, plague, Zika & Ebola viruses etc. According to a study report published in one of the leading regional newspapers-Greater Kashmir on 25th October, 2023, 36712 cases of tuberculosis and 1239 TB-related mortalities have been reported in Jammu & Kashmir in just four years from 2020-2023 [9]. According to another report released by J&K Department of Health and Medical Education on 29th September 2023, the union territory witnessed immense surge in dengue cases, with a significant dengue outbreak in Jammu municipal region, registering 1886 dengue patients [10]. Seven districts of Jammu & Kashmir also witnessed diarrhoea and cholera outbreak in 2010 AD, with 7670 registered cases [11].

All such disease outbreaks are result of poor sanitation, ineffective waste management and defunct drainage networks across the districts of Jammu & Kashmir, predominantly in Srinagar City, Jammu city and other major towns. Dog menace has emerged as new threat to public health and safety in urban areas of J&K. Health experts have time and again raised the alarm bells regarding exponential spike in canine population and dog bite cases. In just six years till March 2023, Kashmir valley witnessed 37,467 animal bite cases, with 72% of them in Srinagar city alone [12]. Health experts have categorically related this alarming man-animal conflict situation to unscientific garbage disposal, poor waste management and growing dog population in J&K.

#### Role of AMRUT Scheme in Promotion of Urban Waste Management in Jammu & Kashmir

In view rapid urbanization due to increased rural-to-urban migration for better education & employment opportunities, to address challenges of urban housing & environment pollution, and to ensure holistic development of urban infrastructure in major cities & towns of the country, Ministry of Housing & Urban Development launched Atal Mission for Rejuvenation and Urban Transformation (AMRUT) on pan-India basis on 25th June, 2015 under the spirit of 'Cooperative Federalism'. The mission aims to focus on thrust areas such as water supply, sewerage facilities and septage management, storm water drains to reduce flooding, pedestrian movement, non-motorized and public transport facilities, parking spaces, and enhancing amenity value of cities by creating and upgrading green spaces, parks and recreational centres, especially for children.

The components of the AMRUT mission consist of capacity building, reform implementation, water supply, sewerage and septage management, storm water drainage, urban transport and development of green spaces and parks, with emphasis on adaptation of

smart features & sustainable technological interventions in the physical infrastructure components in the selected cities & towns. The initial outlay for the mission was Rs 50,000 crore for five years from 2015 to 2019. However, the mission was given five years extension till end of 2025-2026 in view of delay in completion of various projects due to unprecedented COVID-19 pandemic.

AMRUT scheme is presently implemented in Srinagar city, Jammu City, Anantnag Municipal Council and other major towns of Jammu & Kashmir, wherein the respective district administrations are utilizing the available financial resources for construction/development/ renovation of roads and lanes, drainage networks, Sewerage Treatment Plants (STPs), waste management facilities, sanitation services, public parks, green spaces and pedestrian walkways. But the progress of development works taken up under the AMRUT scheme, is miniscule and uneven across the urban regions. While as public toilets have been constructed at multiple locations across Srinagar and Jammu cities, these are not properly maintained. Also, other major towns lack such optimum public toilet facilities, including major district level hospitals and other government offices.

Waste management facilities are also very poor in urban regions of J&K, especially in major towns. Although door-to-door collection of household waste, and distribution of dust bins to households, have been started in Srinagar and Jammu cities, yet no scientific approach has been employed for effective garbage disposal. Also, due to lack of public awareness campaigns and sensitization of field staff, huge chunk of urban waste is littered in open, which is major source for all public health adversaries, including grooming of canines, mosquitoes, rodents, flies etc.

Even in these capital cities, drainage services are very poor, and majority of public drains are either blocked or damaged, which become breeding spaces for vectors of infectious diseases.

The persistent foul smell emanating from garbage dumping sites, such as Achan site in Srinagar, spreads to several kilometers and has taken toll on health of general public, particularly elderly and children, residing around these areas. The littering of household waste and commercial waste into water bodies, has hugely polluted these once sources of fresh consumable water, as well as devastated flora and fauna of these water bodies. The dying lakes of J&K such as Dal-lake,

Mansbal lake, Wular lake, are witness to such anthropogenic catastrophe.

### Public Satisfaction about Urban Waste Management in Jammu & Kashmir

The citizen satisfaction about the impact of the government interventions including AMRUT mission on promotion of urban waste management in Jammu & Kashmir, was evaluated from the feedback of 50 research respondents, including 30 respondents from general public residing in different urban areas across J&K such as Srinagar city, Jammu City, Anantnag Municipal Council, Baramulla town, Sopore town, Katra town, Budgam town etc. as well as 05 senior academic experts from university of Kashmir and University of Jammu, 05 eminent journalists, and 10 officers from respective district administrations. 1-5 Likert Scale has been used to gauge their satisfaction about accessibility, affordability and quality of various urban waste management, sanitation and drainage services in Jammu & Kashmir.

The results as presented below in Tables-2, 3, 4, and 5, reveal that majority of the citizens are least satisfied about accessibility, affordability and quality of waste management, sanitation and drainage services and overall development of urban regions of the union territory, as well as impact of AMRUT scheme on urban

Table 2. Citizen perception about accessibility, affordability and quality of urban waste management, sanitation and drainage services and Impact of AMRUT Scheme on Promotion of Urban Waste Management & Public Health facilities in Urban Regions of Jammu & Kashmir (Scores as per 1-5 Likert Scale)

Descriptive factors/ Variables (→)	Accessibility of Public Services	Affordability of Public Services	Quality of Public Services	Impact of Government Interventions/ AMRUT Scheme	Overall Satisfaction (Mean Value-μ)
Various Services (↓)					
Urban Waste Management Facilities	2	3	1	2	2.0
Drainage Services	1	1	1	1	1.00
Healthcare Services	3	3	1	1	2.0
Recreational Facilities/ Open-green Spaces	2	3	2	2	2.25
Mean Value (μ)	2.0	2.50	1.25	1.50	1.81

transformation, development of waste management facilities and public health services.

The overall mean value of (μ-2.0) reveals that the research respondents i.e. common citizens in general, are least satisfied with the accessibility, affordability and quality of urban waste management, sanitation, drainage, public health and recreational facilities, as well as impact of Government Interventions, including impact of AMRUT scheme on promotion of these public services in urban regions of Jammu & Kashmir. The highest mean value of (μ-2.50) for healthcare services reflects higher public satisfaction about the facilitation of health care facilities services in these urban regions.

In contrast, drainage services (mean value,  $\mu$ -1.0) show the least satisfaction of the respondents about the accessibility, affordability and quality of drainage facilities in urban regions of Jammu & Kashmir. The poor waste management, sanitation and drainage services in the urban regions, especially in Kashmir

urban regions. In contrast, drainage services (mean value,  $\mu$ -1.0) show their least satisfaction about the accessibility, affordability and quality of drainage facilities in urban regions of Jammu & Kashmir. The overall mean value of ( $\mu$ -1.81) reveals that the research respondents i.e. eminent journalists are least

Table 3.0: Perception of Senior Academicians about accessibility, affordability and quality of urban waste management, sanitation and drainage services and Impact of AMRUT Scheme on Promotion of Urban Waste Management & Public Health facilities in Urban Regions of Jammu & Kashmir (Scores as per 1-5 Likert Scale)

Descriptive factors/ Variables (→)	Accessibility of Public Services	Affordability of Public Services	Quality of Public Services	Impact of Government Interventions/ AMRUT Scheme	Overall Satisfaction (Mean Value- $\mu$ )
Various Services (↓)					
Urban Waste Management Facilities	2	3	2	2	2.25
Drainage Services	1	1	1	1	1.00
Healthcare Services	3	3	2	2	2.50
Recreational Facilities/ Open-green Spaces	2	3	2	2	2.25
Mean Value ( $\mu$ )	2.0	2.50	1.75	1.75	2.0

region, were prominent reasons for submergence of most of the towns and low-lying areas of Srinagar, Anantnag, Pulwama, Ganderbal and Baramulla districts during 2014 devastating floods.

The overall mean value of ( $\mu$ -2.125) reveals that the research respondents i.e. senior academicians are also partially satisfied with the accessibility, affordability and quality of urban waste management, sanitation, drainage, public health and recreational facilities, as well as impact of Government Interventions, including impact of AMRUT scheme on promotion of these public services in urban regions of Jammu & Kashmir. The highest mean value of ( $\mu$ -3.0) for healthcare services reflects their higher satisfaction about the facilitation of health care facilities services in these

recreational facilities/ open-green spaces, reflects their higher satisfaction about development of these services in these urban regions. In contrast, drainage services (mean value,  $\mu$ -1.0) show the least satisfaction of the respondents about the accessibility, affordability and quality of drainage facilities in urban regions of Jammu & Kashmir.

**Challenges of Waste Management and Public Health in Urban Regions of Jammu & Kashmir**

As reflected in previous sections of the present study, the urban regions of Jammu & Kashmir are witnessing immense pressure of paced urbanization, increased immigration of people from rural areas and population growth, that has led to scarcity of resources, deficient

Table 4.0: Satisfaction of Eminent Journalists about accessibility, affordability and quality of urban waste management, sanitation and drainage services and Impact of AMRUT Scheme on Promotion of Urban Waste Management & Public Health facilities in Urban Regions of Jammu & Kashmir (Scores as per 1-5 Likert Scale)

Descriptive factors/ Variables (→)	Accessibility of Public Services	Affordability of Public Services	Quality of Public Services	Impact of Government Interventions/ AMRUT Scheme	Overall Satisfaction (Mean Value- $\mu$ )
Various Services (↓)					
Urban Waste Management Facilities	2	3	1	2	2.0
Drainage Services	1	1	1	1	1.00
Healthcare Services	3	3	1	1	2.0
Recreational Facilities/ Open-green Spaces	2	3	2	2	2.25
Mean Value ( $\mu$ )	2.0	2.50	1.25	1.50	1.81

satisfied with the accessibility, affordability and quality of urban waste management, sanitation, drainage, public health and recreational facilities, as well as impact of Government Interventions, including impact of AMRUT scheme on promotion of these public services in urban regions of Jammu & Kashmir. The highest mean value of ( $\mu$ -2.25) for

basic public services and poor life quality. Some vital development challenges of urban areas, including prominent cities and towns of Jammu & Kashmir in terms of waste management and public health. Are as follows:-

Table 5.0: Perception of Officers from Administration, about accessibility, affordability and quality of urban waste management, sanitation and drainage services and Impact of AMRUT Scheme on Promotion of Urban Waste Management & Public Health facilities in Urban Regions of Jammu & Kashmir (Scores as per 1-5 Likert Scale)

<b>Descriptive factors/ Variables (→)</b>	<b>Accessibility of Public Services</b>	<b>Affordability of Public Services</b>	<b>Quality of Public Services</b>	<b>Impact of Government Interventions/ AMRUT Scheme</b>	<b>Overall Satisfaction (Mean Value-<math>\mu</math>)</b>
<b>Various Services (↓)</b>					
Urban Waste Management Facilities	3	3	2	3	2.75
Drainage Services	3	4	3	3	3.25
Healthcare Services	4	3	4	3	3.5
Recreational Facilities/ Open-green Spaces	3	4	3	3	3.25
<b>Mean Value (<math>\mu</math>)</b>	<b>3.25</b>	<b>3.50</b>	<b>3.0</b>	<b>3.0</b>	<b>3.18</b>

The overall mean value of ( $\mu$ -3.18) reveals that the research respondents i.e. officers from the respective district administrations, are partially satisfied with the accessibility, affordability and quality of urban waste management, sanitation, drainage, public health and recreational facilities, as well as impact of Government Interventions, including impact of AMRUT scheme on promotion of these public services in urban regions of Jammu & Kashmir. The highest mean value of ( $\mu$ -3.50) for public healthcare services, reflects their higher satisfaction about development of these services in these urban regions. In contrast, urban waste management services (mean value,  $\mu$ -2.75) show the least satisfaction of the respondents about the accessibility, affordability and quality of waste management facilities in urban regions of Jammu & Kashmir.

- Exponential growth of urban population in recent years, has led to housing congestion, deficiency of open & green spaces, and poor waste management.
- Poverty is another vital development challenge in urban regions of J&K, which also affects proper waste management and sanitation, as well as public health. The poor population usually lives in congested clusters in slum areas or city peripheries, where round the clock garbage collection and sanitation maintenance are very difficult.
- Public Health is also affected mostly in these congested urban clusters, where residents, being socio-economically disadvantageous, are not self-conscious about personal hygiene, cleaning and health.
- These regions are also hot beds of breeding of termites, insects, rodents, mosquitoes and dogs, thereby primarily responsible for most of vector borne diseases.
- Mushrooming of unregulated new apartments and colonies, is another big challenge for waste management and public health in urban regions, as the contractors and owners responsible for development of these housing colonies, are more concerned with profit earning than being concerned with facilitation of critical basic services of sanitation, drainage etc.
- Skewed urban planning approach is another bottleneck for effective waste management and public health services. During erstwhile top-to-bottom planning procedures, local needs and aspirations were least considered, which resulted in unnecessary duplication of development works in some places and anemic negligence of development works in other places. However, due to empowerment of PRI institutions and establishment of NITI Aayog and subsequent decentralized bottom-up planning approach, a need based development process has started in urban regions.
- Deficiency of dust bins at public places and insignificant availability of public toilets in most of urban areas of J&K.
- Lack of public parks, green spaces, community level recreational facilities,

- children play areas and public gym centres, in maximum number of cities and towns in J&K.
9. Lack of public awareness campaigns, community programmes to sensitize general public towards better waste management and personal hygiene practices.

### Conclusion

Availability of optimum waste management, sanitation and public health services, forms core of an urban development plan, and lies at heart of the United Nations Sustainable Development Goals (SDG) framework. Developing countries, like India, need to emphasize adoption of best waste management mechanisms, regulation of housing colonies with

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proper facilities for community parks and recreational facilities, and formulation of area based development strategies, under guidance of national flagship initiatives such as AMRUT scheme. The regions such as Jammu & Kashmir, having world famous tourist destinations and natural landscapes, need to take lead in such initiatives to preserve and protect the environment, and to provide optimum global tourism infrastructure and standards of life quality for citizens and visitors. Public health, public safety and public hygiene, must be incorporated as prime objectives of urban development planning, to ensure inclusive and sustainable development.