Educational Administration: Theory and Practice
2023, 29(4), 3058 - 3073
ISSN: 2148-2403
https://kuey.net/

Research Article

An Analysis Of The Importance Of Urbanization And Urban Initiatives, With Reference To Atal Mission Rejuvenation And Urban Transformation In Kerala

Dr. Archana Aravindan[1*], Dr Arunkumar P.M[2], Anoop V P[3], Dr. Prasanth Warrier C B[4]

[1*]Asst Professor, Department of Commerce, Sree Kerala Varma College Thrissur, Kerala. India
archanavimalmenon@gmail.com
[2]Asst Professor, Department of Commerce, Sree Kerala Varma College Thrissur, Kerala, India
arunkumarmohanan@gmail.com
[3]Asst Professor, Department of Commerce, Sree Sankara College, Mattor, Kalady, Kerala, India
vpanoopssc@gmail.com
[4]Asst Professor, Department of Statistics, Sree Kerala Varma College Thrissur, Kerala. India.
cbpwarrier@gmail.com

Citation: Dr. Archana Aravindan et al. (2023), An Analysis Of The Importance Of Urbanization And Urban Initiatives, With Reference To Atal Mission Rejuvenation And Urban Transformation In Kerala, *Educational Administration: Theory and Practice*, *29*(4), 3058 - 3073
Doi: 10.53555/kuey.v30i5.4900

ARTICLE INFO

ABSTRACT

Understanding the scale, growth, and regional variations in urbanization levels is crucial as we strive for rapid economic growth, job creation, improved urban living standards, and a sustainable environment. It is essential to position our cities as drivers for the structural transformation of the Indian economy. To ensure effective project implementation, the Central Government should enhance its oversight of project progress and implement necessary reforms. As economic growth occurs, there is typically a shift from agriculture to manufacturing and services, leading to increased urbanization. However, for urbanization to positively impact the economy, challenges in physical and civic infrastructure must be addressed. The urban population can play a pivotal role in India's economic growth, provided we alleviate the strain on city systems. The following sections delve into a detailed examination of urbanization and specific urban initiatives monitored by the central government in selected areas of Kerala.

Keywords: Urbanization, City, Planning and Development, Projects

INTRODUCTION

Urbanization in India has undergone substantial and rapid growth in the last two decades. Projections indicate that the urban population is poised to reach nearly 600 million by 2031. According to United Nations estimates, India is expected to contribute the largest share to global urban population growth between 2018 and 2050, with numbers increasing from 461 million in 2018 to 877 million in 2050. While the responsibility for urban development primarily rests with state governments, ensuring effective implementation involves empowering city governments. This empowerment includes bolstering the financial resources of city administrations, enhancing their capacity to address the emerging challenges of urbanization, and establishing a supportive legislative and administrative framework. However, the swift pace of urbanization brings about notable challenges, as urban centers grapple with issues like inadequate planning and suboptimal service delivery. These insights are derived from an analysis of Census data spanning from 1901 to 2011.

OBJECTIVES OF THE STUDY

The objective is to understand the extent of urbanization in India, focusing specifically on the state of Kerala, and to analyze the status of projects under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT). This entails a detailed examination of the progress of AMRUT project components carried out by the Kerala Water Authority (KWA) and Urban Local Bodies (ULBs). Furthermore, the aim is to evaluate the consistency of project completion across different components and urban areas, conducting tests to assess homogeneity in the implementation process.

Table I Urban Rural Population of India 1901-2011

Census Years	Number of Urban agglomeration/towns	Total Population	Urban Population	Rural Population	Urban Population in %
1901	1827	238396327	25851873	212544454	10.84
1911	1825	252093390	25941633	226151757	10.29
1921	1949	251321213	28086167	223235046	11.18
1931	2072	278977238	33455989	245521249	11.99
1941	2250	318660580	44153297	274507283	13.86
1951	2843	361088090	62443709	298644381	17.29
1961	2363	439234771	78936603	360298168	17.97
1971	2590	598159652	109113977	489045675	19.91
1981	3378	683329097	159462547	523866550	23.33
1991	3768	844324222	217177625	627146597	25.72
2001	5161	1027015247	285354954	741660293	27.78
2011	7935	1210193422	377105760	833087662	31.16

(Sources: Various Census reports)

Table I illustrates that India is currently experiencing an increase in its urban population, leading to a growing trend of urbanization in the country.

DEGREE OF URBANISATION IN INDIA

Table II Degree/Index of Urbanization in India from 1901-2011

Census years	Rural Population in %	Urban Population in %	Urban- Rural Ratio(percent)
1901	89.16	10.84	12.16
1911	89.71	10.29	11.47
1921	88.82	11.18	12.58
1931	88.01	11.99	13.63
1941	86.14	13.86	16.08
1951	82.71	17.29	20.91
1961	82.03	17.97	21.91
1971	81.76	19.91	22.31
1981	76.66	23.33	30.44
1991	74.28	25.72	34.63
2001	72.22	27.78	38.48
2011	68.84	31.16	45.27

(Calculated Values)

Table II provides a visual representation of the ongoing rise in India's urban population, contributing to the expanding trend of urbanization in the nation. The level of urbanization is gauged by the percentage of individuals residing in urban areas relative to the total population within a designated geographical area. This metric serves as a quantitative measure to evaluate the extent of urbanization in that particular region.

Proportion of urban population= (U/P) * 100,
Proportion of rural population =(R/P) * 100,
Urban-Rural Ratio= (U/R) *100,
Here U=Urban population, R= Rural population and P= Total population

The ratio U/P, denoting the number of urban dwellers (U) in relation to the total population (P), ranges between 0 and 1, with $0 < U/P < 1$. When the entire population resides in rural areas, the index is 0, signifying an absence of urban population. Conversely, when the entire population resides in urban areas, the index is 1. A ratio of 0.5 implies that there is one urban dweller for every rural person in a scenario where 50% of the population is rural.

The urban-rural ratio, measuring the number of urban dwellers per rural person, ranges from 0 to infinity ($\propto$), with no defined upper limit. The percentage of the population living in rural areas has gradually decreased from 89% to approximately 69% over the span of a century. The urban-rural ratio serves as a direct indicator of the increasing prevalence of urban dwellers compared to rural inhabitants during the process of urbanization in India. In 2011, the urban-rural ratio for India was around 45%, indicating that for every 100 rural residents, there were 45 urban dwellers. These indices collectively highlight that India is undergoing urbanization and is currently in an accelerated stage of this transformative process (Sovani, 1966).

STATE OF URBANISATION IN KERALA

The 'Kerala Model of Development' has gained global acclaim for its unique paradox, wherein the state demonstrates impressive social development indicators despite experiencing relatively modest economic growth. However, the distinctive settlement pattern of human habitation in Kerala, along with its characteristics and implications, is seldom explored within the economic context.

Kerala is renowned for its extensive human settlements, yet it displays a distinctive urban and rural settlement pattern marked by a continuum with a uniform distribution of dwelling units. Simply put, the population is dispersed relatively evenly across the entire state. In contrast to other regions in India, Kerala stands out for having lower population density in urban areas and higher population density in rural areas, highlighting a discernible demographic pattern.

Table III Pace of Urbanization in India

	Fastest growing Urban agglomeration 2015-20	Country	Fastest growing Indian Urban agglomeration 2015-2020	Rate growth in Per cent
1	Malappuram	India	Malappuram	44.05
2	Suquian	China	Kozhikode	34.51
3	Can Tho	Vietnam	Kollam	30.99
4	Kozhikode	India	Thrissur	30.22
5	Abuja	Nigeria	Surat	26.69
6	Suzhou	China	Tirupur	26.21
7	Sharjah	UAE	Thiruvananthapuram	25.57
8	Putian	China	Raipur	22.21
9	Muscat	Oman	Kochi	21.87
10	Dar-es-Salam	Tanzania	Bangalore	21.55
11	Kollam	India	Indore	19.01
12	Wuhu	China	Kota	18.76
13	Thrissur	India	Vijayawada	18.61
14	Yaounde	Camaroon	Rajkot	17.21
15	Batam	Indonesia	Moradabad	17.11

(Based on data from the UN Population Division)

According to the 2011 census, Kerala showcased the highest level of urbanization at 47.71%, surpassing the national average of 31.16% between 2001 and 2011. This reflected a substantial growth rate of 83.20% compared to the previous decade. The analysis suggests that the noteworthy urbanization in the state primarily stems from a shift in occupational patterns, with individuals transitioning from agricultural activities to alternative forms of employment. It is highlighted that in characterizing an area as urban in a state like Kerala, characterized by dispersed settlements, both physical and economic dimensions need consideration.

Table III emphasizes the remarkable growth of urban agglomerations in Kerala between 2015 and 2020. Malappuram district in Kerala has emerged as the fastest-growing urban agglomeration globally, boasting a growth rate of 44.05%. Additionally, Kozhikode, Thrissur, and Kollam districts in Kerala secured 4th, 11th, and 13th positions, respectively, with growth rates of 34.51%, 30.99%, and 30.22%. This underscores that among the 15 fastest-growing urban cities worldwide, three are located in Kerala.

Table IV Kerala-Future Urban Population

Census year	Total population	Growth rate (decade) of total population (trend based)	Urban population growth (Trend based)	Urban population	%Urban
1951	13549118			1825897	13.48
1961	16886394	24.63	3.84	2526473	14.96
1971	21347375	26.42	3.72	3466968	16.24
1981	25453680	19.24	3.7	4751249	18.67
1991	29098518	14.32	6.16	7680194	26.39
2001	31841374	9.43	0.76	8266925	25.96
2011	33387677	4.86	9.27	15932171	47.72
2021	34687677	3.89	6.05	26447403	76.24
2031	35454677	2.21	6.65	44034927	100

(Source: State Urbanisation Report Department of Town & Country Planning, Kerala 2012)

If the current trend of urban population growth persists, the proportion of the future population residing in urban areas in Kerala, as illustrated in Table IV, is projected to peak by 2031. However, this scenario is deemed highly improbable. Considering the anticipated low population growth, it is expected that the quantity of urban functions provided by urban areas in the future will remain unchanged from the present, with an anticipated improvement in quality. There is no significant need for an increase in the geographic size of urban areas beyond their current level. The state's urban vision is centered on revitalized urban areas characterized by a compact urban form, distributed in a balanced and organized manner throughout Kerala. These urban areas are anticipated to fulfill functions that complement the rural hinterland and drive development. According to the UN Population Division, "urban agglomerations" (UAs) are defined as expanded areas surrounding an existing town, encompassing outgrowths such as villages, residential areas, universities, ports, etc., located on

the outskirts of the town. The Census defines an Urban Agglomeration as a continuous urban spread comprising a town and its adjacent urban outgrowths, or two or more physically connected towns together. An example is the National Capital Territory (NCT) of Delhi, an urban agglomeration including the Municipal Corporation of Delhi (MCD) and New Delhi Municipal Council (NDMC) areas, along with 107 "Census towns" that were previously villages but now have over 75% of their population engaged in non-agricultural activities.

Table V Urban India - 2001&2011

Item	2001	2011
Urban population in million	285	377.1
% Urban to total	27.8	31.15
No. of Towns	5161	7935
No. of Statutory Towns	3799	4041

Source: Census of India 200 &2011

The urban population in India exhibited a growth rate of 31.6 percent from 2001 to 2011, with over 7,935 statutory/census towns accommodating 31.2 percent of the population, surpassing the national average. This urbanization trend is observed in 19 states/union territories. Indian cities have some of the highest population densities globally, emphasizing the pivotal role of cities and towns in India's development trajectory. This demographic shift places urban areas at the forefront of India's development, going beyond mere numbers. While urbanization attracts investments, drives development, and concentrates resources, infrastructure, and economic activities, it also presents challenges such as overcrowding, inadequate housing, strain on public services, and environmental issues. Effective management of urban growth becomes crucial for sustainable development and improving the quality of life for urban residents.

Recognizing the importance of urban development, the Indian government initiated various urban development missions, including the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Rajiv Awas Yojana, Swachh Bharat, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Smart Cities Mission, and Housing for All. The recent launch of major urban development missions, namely the Smart Cities Mission, AMRUT, and Housing for All (Urban), marks a new phase of growth. The Smart Cities Mission aims to enhance urban life and ensure cleanliness, while AMRUT focuses on rejuvenating urban areas. The Housing for All (Urban) mission addresses the housing needs of urban dwellers.

To address the challenges of urbanization, the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) was launched in 2015, aiming to develop 500 cities across the country. AMRUT empowers states and urban local bodies to take the lead by prioritizing five core areas. It represents a significant effort to bring about comprehensive urban reforms and address issues such as clean drinking water, air quality, public transportation, traffic management, waste disposal, and affordable housing. The distribution of funds under AMRUT follows a formula based on urban population and the number of cities/towns in each state/Union Territory. The concept of a Smart City involves making cities more liveable and resilient by efficiently using Information and Communication Technology. The development of smart cities is crucial to address challenges arising from increasing urbanization and migration rates, including the development of slum areas. The allocation of the 100 Smart Cities among states and Union Territories is based on an equitable criterion, considering both urban population and the number of statutory towns. This ensures a fair distribution, with each state/Union Territory having a certain number of potential Smart Cities. The distribution formula is also followed for the allocation of funds under AMRUT.

LITERATURE REVIEW

Kundu and Samanta's (2010) meticulous analysis of urban development policies, focusing on the state and size-class levels, equity, and effectiveness of the JNNURM program, revealed that only 58% of the urban population was covered, with higher coverage in developed states and metropolitan cities.

Chetan Vaidya (2013) highlighted the significance of urbanization in large cities, emphasizing India's substantial urban population growth rate of 2.76% annually during 2001-2011. The government's recognition of the importance of innovation for economic growth has led to the incentivization of urban reforms and infrastructure investments, as outlined by Vaidya's exploration of urban innovations.

Govind Gopakumar's (2014) discussion on the transformative impact of JNNURM on cities in India and its influence on urban policy discourse underscored the program's intrusiveness through a techno-managerial approach and discursive technologies.

Chatterjee, S., & Mukherjee, S. (2015) This review focuses on trends, patterns, and policy implications of urbanization in India. It likely provides a comprehensive overview of the historical context and policy frameworks that have shaped urban development in the country.

Prasanth and Praseeja's (2016) study on population density and its relationship with distance from the city center provided insights into the uniform spread of cities and the close relationship between city population and rank, utilizing the rank-size rule.

Sinha, R., & Agarwal, S. (2017): The study concentrates on the environmental impacts of urbanization in India. It is likely to explore issues such as pollution, resource depletion, and the ecological consequences of rapid urban growth.
Vlahov D. (2017) emphasized the dominance of cities as the primary mode of living and the correlation between urban growth and concentrated disadvantage, pointing towards increasing inequities across various dimensions.
Prasanth and Praseeja's (2017) use of the Markov Chain model to compare the nature of urbanization in Kerala and Tamil Nadu, projecting urban population for the next five decades, demonstrated the model's suitability for studying city size distribution.
Archana and Prasanth's (2018) examination of city expansion and urbanization patterns in Kerala highlighted unique features, such as semi-circular and circular expansions.
Bhagat's (2018) assessment of the emerging pattern of urbanization in India analyzed spatial distribution and factors contributing to urban growth, revealing insights into the low levels of urbanization in central, eastern, and northeastern regions.
David Sadoway et al.'s (2018) discussion on JNNURM as a window into the evolution of urban governance in India highlighted its progressive centralization, diminished local capacities, and commercially-oriented infrastructure development.
Jha, S., & Bhatia, S. (2018) emphasizes on the dynamics of urbanization and socioeconomic implications suggests that this review may delve into the multifaceted nature of urban growth, exploring its consequences on society and economy.
Russell and Pathak (2018) focused on the challenges of urban growth and development in India, highlighting government initiatives like the Smart Cities Mission and the AMRUT Yojana program. These programs, along with local efforts, aim to enhance urban efficiency through improved planning, design, and engineering.
Gupta, A., & Shukla, A. (2019) Focusing on urbanization and health, this review is likely to provide insights into the public health challenges posed by rapid urbanization in India. It might explore issues such as healthcare access, disease prevalence, and the overall health impact on urban populations.
Singh, A., & Verma, A. (2020) The review is likely to offer a critical examination of empirical evidence on the relationship between urbanization and economic growth in India. It might assess the role of cities as economic drivers and the challenges associated with this process.
While the urban renewal missions face challenges, experts acknowledge the absence of a singular vision for a smart city. Transforming densely populated cities into smart cities raises concerns, and insufficient budgetary allocations necessitate greater financial contributions from state governments. Public-Private Partnerships (PPP) play a key role, and coordinating multiple agencies is crucial. The competitive model for selecting smart cities may lead to innovative solutions, and planned investments under AMRUT, Housing for All, and the Smart Cities Mission will stimulate growth in related industries. Fostering synergy among regulatory authorities, residents, and urban service providers can significantly improve governance and life in Indian cities.

ATAL MISSION FOR REJUVENATION AND URBAN TRANSFORMATION

AMRUT, launched by Prime Minister Narendra Modi in June 2015, is a scheme focusing on urban renewal projects. It succeeds the JNNURM program, adopting a project-based approach to provide essential infrastructure services such as water supply, sewerage, transportation, and green spaces in 500 locations across India. The scheme aims to enhance the amenity value of cities and reduce pollution, emphasizing tap water and sewerage connections for every household.
Under AMRUT, states and union territories receive a 10% budget allocation incentive based on the previous year's reforms. It allows flexibility in designing and executing schemes tailored to the specific needs of identified cities. The scheme addresses various challenges faced by its predecessor, JNNURM, including a streamlined release of funds and reduced central government appraisal of individual projects.
AMRUT's primary objectives include ensuring tap water and sewerage connections for every household, developing green spaces, and promoting public transport. Funds are released in three installments, with the central government contributing 50% of the project cost for cities with a population up to 10 lakh. The remaining funds are expected to be mobilized by the states.
The scheme incorporates 11 reforms to be implemented within four years, incentivizing good performers. Challenges include the need for synergy among different urban renewal schemes and a shortage of experts in smaller tier-II cities. It emphasizes balanced development across states and cities and has significant real estate impacts, introducing flexibility in project execution.
Recent modifications focus on a transformative approach, reducing the number of reforms, and shifting from penalization to incentivization. The Reforms Incentive Fund has been increased six-fold, and states are encouraged to resort to market borrowings and institutional finance. The aim is to empower ULBs financially, encourage sustainable financing mechanisms, and widen the reach of the scheme. In summary, AMRUT seeks to address urban infrastructure challenges through a focused, incentive-driven approach, promoting transformative reforms, and empowering local bodies for sustainable urban development.

Table VI. Comparative Analysis Of Urban Initiatives

S. No		JNNURM	AMRUT	Smart cities Mission
1	Launched	2005	2015	2015
2	Funding	A total of Rs 15,000 crore for 7 years	A total of RS 50,000 crore has been allocated for 500 cities	A total of Rs 48,000 crore would be spent on creating 100 smart cities across India.
3	Selection process	63 select cities/Urban Agglomerations (UAs) as per 2001 Census	States have been asked to recommend cities which can be included under this scheme	The 100 smart cities will be selected on the basis of a city challenge competition
4	Implementation	Central Govt/State Govt	Central Govt/State Govt/ULB	Central Govt/State Govt
5	Components	To create economically productive, efficient, equitable &responsive Cities, provision of Basic Services to Urban Poor (BSUP) and wide-ranging urban sector reforms to strengthen municipal governance	Water supply, greenery and well-maintained open space, sewerage network, draining system, transportation facilities, available digital and internet facilities, industrial facilities etc.	Making them citizen friendly and sustainable
6	In Kerala	Kochi, Kollam & Thiruvananthapuram	Thiruvananthapuram, Kollam, Kochi, Thrissur, Guruvayur, Palakkad, Kozhikode & Kannur	Kochi
7	Progress	Gujarat led the tally for the state level reforms, being the only state to have achieved all 10 reforms required by the mission. Visakhapatnam, Surat& Pune had the distinction of having accomplished all 8 city level reforms. Chennai, Greater Mumbai & Hyderabad had achieved 7 out of 8 reforms. Out of 67 cities, 30 had achieved the 90% target.	59 lakh water tap connections, 37 lakh sewage connections, 62 lakh LED lights replaced etc	897 cities work completed (14860crore)

Gujarat has emerged as a trailblazer in state-level reforms, attaining all 10 requisites mandated by the JNNURM (Jawaharlal Nehru National Urban Renewal Mission) and making significant strides under the AMRUT (Atal Mission for Rejuvenation and Urban Transformation) initiative. The state, under AMRUT, has initiated 539 projects with an impressive investment of Rs. 7,305.88 crore. These projects encompass crucial facets such as water supply, sewerage and septage management, and water supply augmentation.

An illustrative breakdown reveals that among these projects, 125 are dedicated to providing water supply connections to all households, ensuring water supply at the normative 135 liters per head per day in 91 cities, amounting to a total expenditure of Rs. 3,727.79 crore. Complementing these efforts are 50 projects focusing on sewerage and septage management, alongside water supply augmentation initiatives in 39 mission cities, with an investment of Rs. 3,207.85 crore. Furthermore, 329 projects, valued at an estimated Rs. 9,506.15 crore, are on the verge of completion.

An integral facet of the AMRUT initiative is the development of open and green spaces, and substantial investments have been earmarked for this purpose. Notably, an approved investment of Rs. 30,657 crore was allocated under the Atal Mission in 2016 alone. These funds are designated for enhancing infrastructure related to water supply, sewerage networks, stormwater drains, urban transport (with a specific focus on non-motorized transport), and open and green spaces.

Adding to these commendable strides, the Smart Cities Mission has reached a significant milestone, with the completion of work in 897 cities. The most recent statistics underscore the considerable emphasis on fortifying urban infrastructure and delivering essential services across a multitude of cities in India. These achievements stand as a testament to the concerted efforts and strategic investments made under the AMRUT and Smart Cities initiatives, showcasing Gujarat's commitment to sustainable urban development.

Table VII - Data on Urban Population and Allocation of Amrut Cities in India

Name of State/UT	Statutory Towns	Census Towns	Urban Population		AMRUT Cities
			Total	%Urbanization	
Andaman &Nicobar	1	4	1,43,488	37.70%	1
Andhra Pradesh	83	228	1,47,45,080		33
Arunachal Pradesh	26	1	3,17,369	22.94%	1
Assam	88	126	43,98,542	14.10%	4
Bihar	139	60	1,17,58,016	11.29%	27
Chandigarh	1	5	10,26,459	97.25%	1
Chhattisgarh	168	14	59,37,237	23.24%	9
Dadra Nagar Haveli	1	5	1,60,595	46.72%	1
Daman & Diu	1	6	1,82,851	75.17%	1
Goa	14	56	9,06,814	62.17%	1

Gujarat	195	153	2,57,45,083	42.60%	31
Haryana	80	74	88,42,103	34.88%	20
Himachal Pradesh	56	3	6,88,552	10.03%	2
Jammu &Kashmir	86	36	34,33,242	27.38%	5
Jharkhand	40	188	79,33,061	24.05%	7
Karnataka	220	127	2,36,25,962	38.67%	27
Kerala	59	461	1,59,34,926	47.70%	9
Lakshadweep	1	6	50,332	78.07%	1
Madhya Pradesh	364	112	2,00,69,045	27.63%	34
Maharashtra	256	278	5,08,18,259	45.22%	44
Manipur	28	23	8,34,154	32.45%	1
Meghalaya	10	12	5,95,450	20.07%	1
Mizoram	23	0	5,71,771	52.11%	1
Nagaland	19	7	5,70,966	28.86%	2
Delhi	3	110	1,63,68,899	97.50%	1
Orissa	107	116	70,03,656	16.69%	9
Puducherry	6	4	8,52,753	68.33%	1
Punjab	143	74	1,03,99,146	37.48%	16
Rajasthan	185	112	1,70,48,085	24.87%	29
Sikkim	8	1	1,53,578	25.15%	1
Tamil Nadu	721	376	3,49,17,440	48.40%	33
Telangana	42	0	1,36,08,665	38.67%	12
Tripura	16	26	9,61,453	26.17%	1
Uttar Pradesh	648	267	4,44,95,063	22.27%	61
Uttarakhand	74	41	30,49,338	30.23%	7
West Bengal	129	780	2,90,93,002	31.87%	60

Source: Census 2011 MoUD, https://amrutkerala.org/

Given the provided information, a comprehensive examination of the allocation and execution of projects within the AMRUT initiative in Kerala can be undertaken, focusing on the five key components: Water Supply (WS), Sewerage (SEW), Urban Transport (UT), Solid Waste Disposal (SWD), and Green Spaces and Parks (PARK). The selected urban areas in Kerala covered by AMRUT include Thiruvananthapuram (TVM), Kollam (KLM), Alappuzha (ALP), Kochi (KOC), Thrissur (TCR), Guruvayur (GUV), Palakkad (PKD), Kozhikode (KOZ), and Kannur (KNR). Out of the total 1025 projects, 948 projects have received approval in these designated areas.

To assess the project distribution across components, the allocation of these 948 projects will be scrutinized, considering the five mission components: Water Supply (WS), Sewerage (SEW), Urban Transport (UT), Solid Waste Disposal (SWD), and Green Spaces and Parks (PARK). Further investigation can be conducted based on the number of projects successfully completed within the specified timeframe, offering valuable insights into the advancement and implementation status of AMRUT initiatives in Kerala.

Table VIII Total Projects Sanctioned AMRUT – Project Abstract

MILESTONE	TVM	KLM	ALP	KOC	TCR	GUV		PKD	KZD	KNR	TOTAL
Total Projects	275	60	199	97	121	34		152	50	37	1025
Total Projects sanctioned	250	52	179	95	110	33		146	48	35	948
Work Completed	135	20	79	45	49	10		55	10	10	413
Sanctioned Work Completed in %	54	38.5	44	47	44.5	30		38	21	28.5	43.5

Source: https://amrutkerala.org/

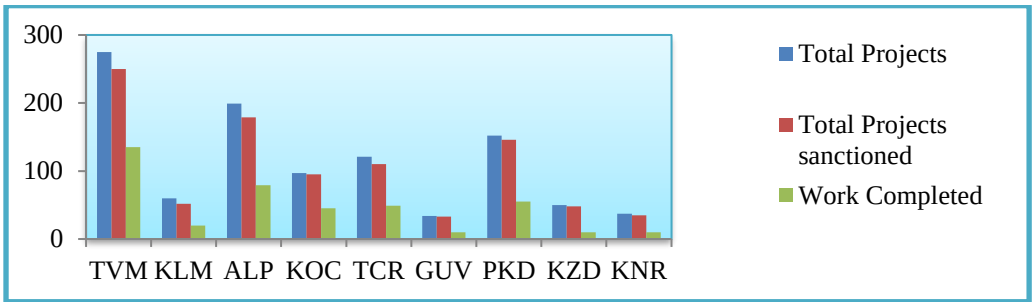

Figure I: Total Amrut Projects in Kerala

The examination of Table VIII reveals that Thiruvananthapuram boasts the highest project count (275) and the most substantial percentage of sanctioned work completion (54%), as illustrated in Figure 1. Conversely, Kozhikode exhibits the lowest number of projects and the lowest work completion percentage (21%). To discern the factors contributing to these disparities, a crucial analysis is required to ascertain whether they stem from funding delays or inefficiencies within the governing bodies.

A pivotal aspect to consider is whether the discrepancies in project numbers and completion percentages result from delayed funding. It is plausible that inadequate funding or delays in fund disbursement have impacted

the pace and culmination of projects in specific regions. A shortage of financial resources can impede the execution of infrastructure initiatives and lead to sluggish progress.

Another factor meriting investigation is the effectiveness of the authorities overseeing project execution. Differences in project numbers and completion rates may be linked to variations in the competency and efficiency of the governing bodies responsible for project oversight and management. Ineffective project management, a lack of coordination, bureaucratic obstacles, or delays in decision-making could contribute to lower completion percentages.

To pinpoint the precise causes behind these disparities, a comprehensive analysis is imperative. This analysis should delve into the funding mechanisms, financial management practices of the authorities, the overall project execution process, and any other pertinent factors influencing project progress and completion. By scrutinizing these aspects, a more nuanced understanding can be attained regarding whether the variations primarily stem from funding issues or inefficiencies in the authorities' performance.

Table IX- Total Projects Sanctioned

	WS	SEW	SWD	UT	PARK	TOTAL
TVM	45	93	107	2	3	250
KLM	12	0	22	8	10	52
ALP	7	0	151	14	7	179
KOC	17	0	51	21	6	95
TCR	18	0	66	21	7	112
GUV	6	0	16	5	6	33
PKD	13	0	82	31	20	146
KOZ	30	0	10	1	7	48
KNR	14	0	10	4	5	33
TOTAL	162	93	515	107	71	948

Source: https://amrutkerala.org/

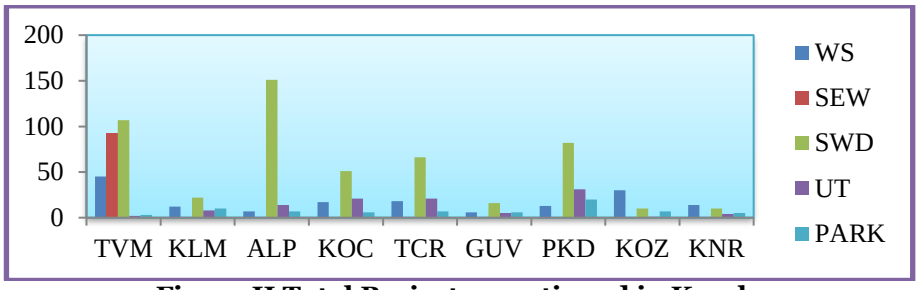

Figure II Total Projects sanctioned in Kerala

Table IX furnishes a comprehensive summary of the distribution of projects across nine urban areas concerning the five distinct components of AMRUT. This data is visually depicted in Figure 2. Notably, the stormwater drainage (SWD) component stands out with the highest number of allocated projects, with a particular emphasis on the district of Alappuzha, taking into account the geographical characteristics of the region.

Table X Total Projects in 5 Different Components of AMRUT Sanctioned in 9 Cities

Components	WS	SEW	SWD	UT	PARK	Total
Total	162	93	515	107	71	948

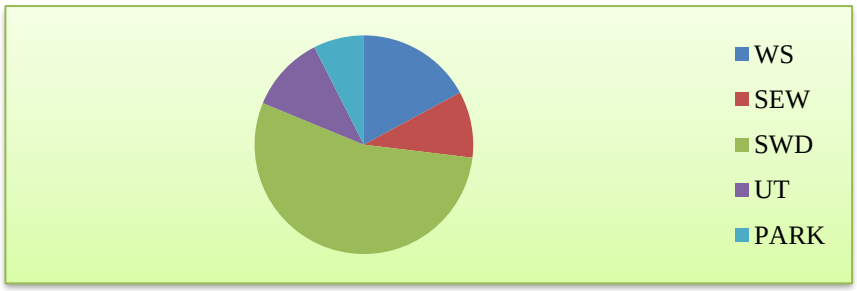

Figure 3 Total Projects sanctioned in 5 different components of AMRUT sanctioned in 9 cities

As illustrated in Table X, there is a collective total of 162 projects dedicated to enhancing water supply in the considered urban areas. The initiatives aimed at improving sewerage facilities amount to 93 projects. Remarkably, the largest number of projects, totaling 515, is directed towards the improvement of stormwater drainage systems. This underscores a substantial emphasis on addressing challenges associated with stormwater management within the urban initiatives. The urban transport component is associated with 107 projects, indicating a concerted effort to enhance transportation infrastructure and services in these areas.

Moreover, there are 71 projects dedicated to the creation and improvement of green spaces and parks, underscoring the significance of providing recreational areas and augmenting the overall quality of urban environments. This comparative analysis facilitates an understanding of project allocation across diverse components, shedding light on the specific areas of focus and investment within urban development initiatives.

Table XI - Sanctioned Work Completed (%)

MILESTONE	TVM	KLM	ALP	KOC	TCR	GUV	PKD	KZD	KNR	TOTAL
Total Projects	275	60	199	97	121	34	152	50	37	1025
Work Completed	135	20	79	45	49	10	55	10	10	413
Sanctioned Work Completed in %	54	38.5	44	47	44.5	30	38	21	28.5	43.5

Figure 4. Sanctioned Work- Completed in %

Table XI furnishes a detailed examination of milestones and work completion status across different urban areas. In Thiruvananthapuram, out of the 275 projects allocated, 135 have been successfully completed, marking a commendable work completion percentage of 54%. This signifies substantial progress in project implementation in the capital city. Kollam, with a total of 60 projects, has seen the completion of 20 projects, resulting in a work completion percentage of 38.5%. Although progress has been made, there is room for further implementation in Kollam. Alappuzha, boasting 199 projects, has completed 79, reflecting a work completion percentage of 44%. The city has made significant strides, yet additional efforts are required to complete more projects. Kochi, with 97 projects in total, has successfully completed 45, yielding a work completion percentage of 47%. The city is steadily advancing in project implementation. Thrissur, with 121 projects, has completed 49, indicating a work completion percentage of 44.5%, suggesting moderate progress in project implementation. Guruvayur, with 34 projects, has seen the completion of 10, resulting in a work completion percentage of 30%. Further efforts are required to complete the remaining projects. Palakkad, boasting 152 projects, has completed 55, accounting for a work completion percentage of 38%. The city has made considerable progress but needs to focus on completing the pending projects. Kozhikode, with 50 projects, has only completed 10, resulting in a work completion percentage of 21%. The city lags in completion rate compared to others and needs to accelerate project implementation. Kannur, featuring 37 projects, has completed 10, representing a work completion percentage of 28.5%, indicating room for improvement in completing the remaining projects.

Table XII Completed Projects In 9 Urban Areas

	TVM	KLM	ALP	KOC	TCR	GUV	PKD	KZD	KNR	TOTAL
Total Projects	250	52	179	95	110	33	146	48	35	948
Completed Projects	135	20	79	45	49	10	55	10	10	413

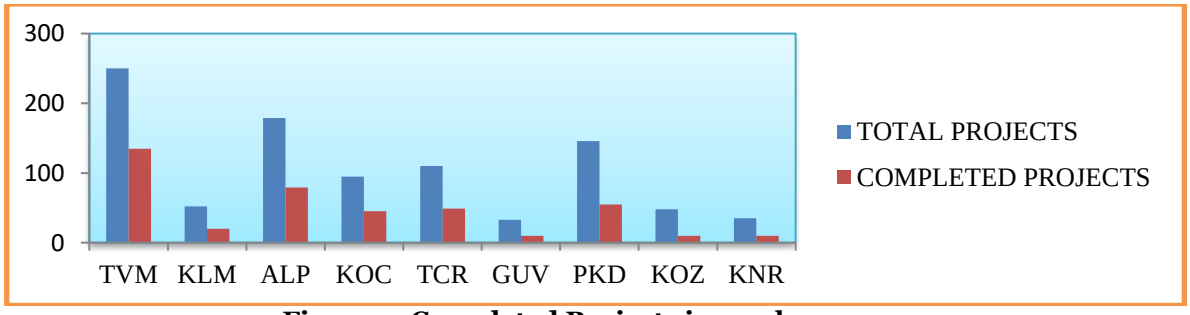

Figure 5. Completed Projects in 9 urban areas

Table XII illustrates the completion status of projects in different cities. Thiruvananthapuram, the capital city, has exhibited notable progress with 135 out of 250 projects completed in time, accounting for a completion rate of 54%. On the other hand, Calicut has seen a lower completion rate, with only 10 out of 48 projects completed on time, marking a completion percentage of 21%. On average, across Kerala, approximately 43.5% of the projects have been successfully completed within the stipulated time frame.

Table XIII. Details Of Completed Amrut Works as On Feb.2020

ULB	Kerala Water Authority (KWA)						Urban Local Bodies (ULB)								Tot (og)	GT (comp)	GT
	WS	SEW	Total	WS (og)	SEW (og)	Tot (og)	SWD	UT	PARK (comp)	Total (comp)	SWD (og)	UT (og)	PARK (og)	Total (og)			
TVM	14	43	57	31	50	81	76	1	1	78	31	1	2	34	115	135	250
KLM	7	0	7	5	0	5	5	2	6	13	17	6	4	27	32	20	52
ALP	1	0	1	6	0	6	73	4	1	78	78	10	6	94	100	79	179
KOC	5	0	5	12	0	12	33	5	2	40	18	16	4	38	50	45	95
TCR	2	0	2	16	0	16	42	2	3	47	22	19	4	45	61	49	110
GUV	0	0	0	6	0	6	10	0	0	10	6	5	6	17	23	10	33
PKD	0	0	0	13	0	13	43	7	5	55	39	24	15	78	91	55	146
KOZ	9	0	9	21	0	21	1	0	0	1	9	1	7	17	38	10	48
KNR	5	0	5	9	0	9	3	0	2	5	9	4	3	16	25	10	35
GT	**43**	**43**	**86**	**119**	**50**	**169**	**286**	**21**	**20**	**327**	**229**	**86**	**51**	**366**	**535**	**413**	**948**

Total (Tot), Grand Total (GT), Completed (comp), ongoing (og)

As per Table XIII, Thiruvananthapuram emerges as the urban area taking the lead with the maximum number of ongoing and completed projects across different components. This underscores a pronounced commitment to urban development and infrastructure enhancement in the region. The remaining urban areas exhibit diversity in the quantity of projects and their completion status, indicating differing priorities and stages of progress in the implementation of urban initiatives.

Table XIV Details of Works Amrut Through Kerala Water Authority

KWA															
ULB	A	B	C	D = (C/J)x 100	E	F	G	H = (G/J) x 100	J	K= (C/N) x 100	L= (G/P) x 100	M= (J/Q) x 100	N	P	Q
	WS	SEW	Total comp	% (comp)	WS (og)	SEW (og)	Tot (og)	% (og)	KWA GT	KWA % (comp)	KWA % (og)	KWA %	GT comp	GT (og)	GT
TVM	14	43	57	41	31	50	81	59	138	42	70	55	135	115	250
KLM	7	0	7	58	5	0	5	42	12	35	16	23	20	32	52
ALP	1	0	1	14	6	0	6	86	7	1	6	4	79	100	179
KOC	5	0	5	29	12	0	12	71	17	11	24	18	45	50	95
TCR	2	0	2	11	16	0	16	89	18	4	26	16	49	61	110
GUV	0	0	0	0	6	0	6	100	6	0	26	18	10	23	33
PKD	0	0	0	0	13	0	13	100	13	0	14	9	55	91	146
KOZ	9	0	9	30	21	0	21	70	30	90	55	63	10	38	48
KNR	5	0	5	36	9	0	9	64	14	50	36	40	10	25	35
GT	**43**	**43**	**86**	**34**	**119**	**50**	**169**	**66**	**255**	**21**	**32**	**27**	**413**	**535**	**948**

Table XIV provides a comprehensive comparative analysis of projects executed by the Kerala Water Authority (KWA) under the AMRUT initiative. Notably, KWA has successfully completed 43 projects, constituting 50% of the total completed projects (86) in the Water Supply component. Concurrently, ongoing Water Supply projects represent 34% of the total ongoing projects (119). In the Sewerage domain, while KWA has not completed any projects, it is actively engaged in 50 ongoing projects. KWA, as a whole, has accomplished 66% of the overall completed projects (130), with 169 ongoing projects, contributing to 32% of the total ongoing projects (535). It is imperative to acknowledge the variability in completion percentages across different components. For instance, the completion rate for Water Supply stands at 42%, whereas it is 16% for Sewerage,

illustrating the efficiency comparison. Overall, KWA has demonstrated commendable progress in concluding Water Supply projects, underscoring its proactive participation in the AMRUT initiative. However, focused attention is required in the Sewerage component, where completed projects are yet to be reported.

Table XV Details of AMRUT Through Works Urban Local Bodies

ULB															
	A	B	C	D	E= (D/L) x 100	F	G	H	J	K= (J/L)x100	L = D+J	M = (D/N)x 100	N	P	Q
ULB	SWD	UT	PARK	Tot (comp)	ULB % (comp)	SWD (og)	UT (og)	PARK (og)	Tot (og)	ULB % (og)	ULB GT	ULB % (comp)	GT (comp)	GT (og)	GT
TVM	76	1	1	78	70	31	1	2	34	30	112	58	135	115	250
KLM	5	2	6	13	33	17	6	4	27	67	40	65	20	32	52
ALP	73	4	1	78	45	78	10	6	94	55	172	99	79	100	179
KOC	33	5	2	40	51	18	16	4	38	49	78	89	45	50	95
TCR	42	2	3	47	51	22	19	4	45	49	92	96	49	61	110
GUV	10	0	0	10	37	6	5	6	17	63	27	100	10	23	33
PKD	43	7	5	55	41	39	24	15	78	59	133	100	55	91	146
KOZ	1	0	0	1	6	9	1	7	17	91	18	10	10	38	48
KNR	3	0	2	5	24	9	4	3	16	76	21	50	10	25	35
GT	286	21	20	327	47	229	86	51	366	53	693	79	413	535	948

Table XV provides a comparative analysis of projects undertaken by Urban Local Bodies (ULB) as part of the AMRUT initiative. The table details the number of completed projects for each component, encompassing Storm Water Drainage (SWD), Urban Transport (UT), and Development of Green Spaces and Parks (PARK). Impressively, the ULB has accomplished a total of 327 projects, constituting 47% of the overall completed projects (693). The completion percentages exhibit variability across components, with SWD at 47%, UT at 86%, and PARK at 51%. Notably, the ULB's commendable contribution encompasses 53% of the overall completed projects (413) and 69% of the total ongoing projects (535). The completion percentages for ULB projects range from 30% to 91% across different components. With a comprehensive project count of 366, including both completed and ongoing projects, the ULB has demonstrated noteworthy progress under the AMRUT initiative. The variations in completion rates and contributions underscore differences in project efficiency and focus across components, highlighting the ULB's substantial impact on the overall success of the initiative.

Table XVI - Completed Projects Through KWA & ULB

	Completed Projects	KWA	ULB
TVM	135	57	78
KLM	20	7	13
ALP	79	1	78
KOC	45	5	40
TCR	49	2	47
GUV	10	0	10
PKD	55	0	55
KOZ	10	9	1
KNR	10	5	5
TOTAL	**413**	**86**	**327**

Source - https://amrutkerala.org/

Figure 6. Completed Projects through KWA & ULB

Table XVI provides a comprehensive overview of completed projects under the AMRUT initiative, distinguished by the implementing agencies—Kerala Water Authority (KWA) and Urban Local Bodies (ULB). Notably, the ULB emerges as a pivotal contributor, successfully completing a total of 327 projects, constituting a significant majority (79% of the total completed projects). In comparison, the KWA has accomplished 86 projects, representing 21% of the total completed projects. Thiruvananthapuram (TVM) stands out with the highest number of completed projects (135), where KWA handled 57 projects, and ULB executed 78 projects. The distribution of completed projects showcases collaborative efforts between KWA and ULB, with varying contributions in different cities. With a total of 413 completed projects, the ULB significantly outpaces KWA, underscoring its crucial role in the successful implementation of AMRUT initiatives. This data underscores the synergistic endeavors of both agencies in effectively advancing urban development across diverse cities in Kerala.

Table XVII Details of Completed Amrut Components At 9 Cities in Kerala as on Feb.2020

	WS	SEW	SWD	UT	PARK	TOTAL
TVM	14	43	76	1	1	135
KLM	7	0	5	2	6	20
ALP	1	0	73	4	1	79
KOC	5	0	33	5	2	45
TCR	2	0	42	2	3	49
GUV	0	0	10	0	0	10
PKD	0	0	43	7	5	55
KOZ	9	0	1	0	0	10
KNR	5	0	3	0	2	10
TOTAL	**43**	**43**	**286**	**21**	**20**	**413**

Table XVII presents the details of completed components under the AMRUT initiative in nine cities in Kerala as of February 2020. The total number of completed Water Supply (WS) components across the nine cities is 43. The Sewerage (SEW) components have also been completed in all nine cities, totaling 43. Among the components, Storm Water Drainage (SWD) has the highest completion rate, with a total of 286 completed components across the cities. The Urban Transport (UT) components have a relatively lower completion rate, with only 21 completed components. The Park (PARK) components have a similar completion rate to UT, with a total of 20 completed components. The total number of completed components across all five categories is 413. The table provides a breakdown of completed components for each city. For example, Thiruvananthapuram (TVM) has completed 14 WS components, 43 SEW components, 76 SWD components, 1 UT component, and 1 PARK component. In summary, the table illustrates the progress made in completing different components under the AMRUT initiative in nine cities in Kerala. The majority of completed components are in the SWD category, followed by WS and SEW. The completion of UT and PARK components is relatively lower.

Table XVIII Details of Completed Amrut Components At 9 Cities In Kerala Through KWA& ULB

	WS, SEW	TOTAL KWA	SWD, UT, PARK	TOTAL ULB	TOTAL COMPLETED	TOTAL PROJECTS	COMPLETED %
TVM	57	138	78	112	135	250	54
KLM	7	12	13	40	20	52	38
ALP	1	7	78	172	79	179	44
KOC	5	17	40	78	45	95	47
TCR	2	18	47	92	49	110	45
GUV	0	6	10	27	10	33	30
PKD	0	13	55	133	55	146	38
KOZ	9	30	1	18	10	48	21
KNR	5	14	5	21	10	35	29
TOT	**86**	**255**	**327**	**693**	**413**	**948**	**44**

Table XVIII presents a comparative analysis of the completed AMRUT components in the 9 cities of Kerala through the Kerala Water Authority (KWA). The completion percentage for Water Supply (WS) and Sewerage (SEW) components combined is approximately 21%. Thiruvananthapuram has the highest number of completed works, indicating progress in improving water supply and sewage systems. Guruvayur has the lowest completion percentage, suggesting a need for further development in these components. The completion percentage for Storm Water Drainage (SWD), Urban Transport (UT), and Park components combined is approximately 47%. Alappuzha has shown significant progress in completing works related to SWD, UT, and Park components. Kannur has a lower completion percentage, indicating the need for more attention and efforts in these areas. The total completion percentage for all components combined is approximately 44%. Thiruvananthapuram has shown the highest progress in completing the overall projects, while Guruvayur has the lowest completion percentage. The analysis highlights variations in the completion rates across different components and cities. It indicates that there is still significant work to be done to fully

implement the AMRUT projects in Kerala. Efforts should be directed towards accelerating the completion of works, particularly in areas with lower completion percentages.

Table XIX. details of ongoing AMRUT works as on Feb.2020

	WS	SEW	SWD	UT	PARK	TOTAL
TVM	31	50	31	1	2	115
KLM	5	0	17	6	4	32
ALP	6	0	78	10	6	100
KOC	12	0	18	16	4	50
TCR	16	0	22	19	4	61
GUV	6	0	6	5	6	23
PKD	13	0	39	24	15	91
KOZ	21	0	9	1	7	38
KNR	9	0	9	4	3	25
TOTAL	**119**	**50**	**229**	**86**	**51**	**535**

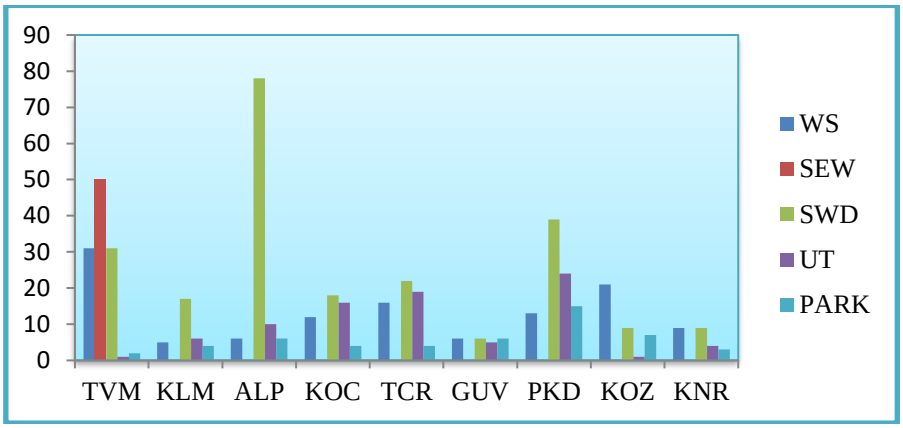

Figure 7. Details of ongoing Works as on Feb.2020

In Table XIX, details of ongoing AMRUT works in the 9 cities of Kerala are categorized by different components. The number of ongoing works for Water Supply is 119, indicating a significant focus on improving water supply infrastructure in these cities. There are 50 ongoing works related to sewage, suggesting efforts to enhance sewage management and sanitation systems. The highest number of ongoing works, 229, is attributed to stormwater drainage, indicating the emphasis on managing and improving the drainage systems in urban areas. There are 86 ongoing works for urban transport, pointing towards initiatives to enhance transportation infrastructure and address mobility challenges. The number of ongoing works for parks is 51, indicating a focus on creating and improving recreational spaces in these cities. Overall, the ongoing AMRUT works highlight the comprehensive approach towards urban development in these cities, with a significant emphasis on improving water supply, sewage management, stormwater drainage, urban transport, and the development of parks. This indicates a multi-faceted approach to enhance the liveability and infrastructure of these urban areas. The comparative analysis shows varying levels of ongoing works across the components, reflecting the different priorities and needs of each city. The data suggests that different components receive varying levels of attention and investment based on the specific requirements and challenges faced by each city.

Table XX Details of completed works in % as on Feb.2020

ULB	**KWA**						**ULB**						
	WS	**SEW**	**Tot** (comp)	Tot (og)	**Tot projects**	**(comp) %**	**SWD**	**UT**	**PARK**	**Tot** (comp)	Tot (og)	**Tot projects**	(comp) **%**
TVM	14	43	57	81	138	**41**	76	1	1	78	34	112	70
KLM	7	0	7	5	12	**58**	5	2	6	13	27	40	33
ALP	1	0	1	6	7	**14**	73	4	1	78	94	172	45
KOC	5	0	5	12	17	**29**	33	5	2	40	38	78	51
TCR	2	0	2	16	18	**1**	42	2	3	47	45	92	51
GUV	0	0	0	6	6	**0**	10	0	0	10	17	27	37
PKD	0	0	0	13	13	**0**	43	7	5	55	78	133	41
KOZ	9	0	9	21	30	**30**	1	0	0	1	17	18	6
KNR	5	0	5	9	14	**36**	3	0	2	5	16	21	24
GT	**43**	**43**	**86**	**169**	**255**	**34**	**286**	**21**	**20**	**327**	**366**	**693**	**47**

In the analysis of completed projects, Water Supply (WS) and Sewerage (SEW) fall under the monitoring of the Kerala Water Authority (KWA), while Stormwater Drainage (SWD), Urban Transport (UT), and Parks (PARK) are handled by Urban Local Bodies (ULB). KWA is responsible for a total of 255 projects, out of which 86 projects have been completed. Conversely, ULB has completed 327 out of the 693 projects assigned to them.

The completion of these components can be influenced by various factors such as timely funding, availability of skilled labor, and project complexity.

To statistically analyze the efficiency of work completion between the two local bodies (KWA and ULB), we can test the null hypothesis H0: P1 = P2 against the alternative hypothesis H1: P1 < P2 at a significance level of α = 0.05. The estimated population proportion is calculated as P = (86+327)/ (255+693) = 0.44. The complementary proportion is Q = 1 – P = 0.56. Using the test statistic Z = (p1 - p2)/sqrt[(PQ)(n1n2)/(n1+n2)], where p1 = 0.34 and p2 = 0.47 (sample proportions), we find that the calculated test statistic Z = -3.58. Comparing this with the critical value from the standard normal distribution at α = 0.05 (which is 1.645), we find that the p-value is 0.002. Therefore, we reject the null hypothesis and conclude that the proportion of completed works by ULB is significantly higher than that by KWA.

Table XXI Details Of Completed Works of Each Component In % As on Feb.2020

	WS	SEW	SWD	UT	PARK	TOTAL%
TVM	31	46	71	50	33	54
KLM	58	0	23	25	60	38
ALP	14	0	48	29	14	44
KOC	29	0	65	24	33	47
TCR	11	0	64	9	43	44
GUV	0	0	63	0	0	30
PKD	0	0	52	23	25	38
KOZ	30	0	10	0	0	21
KNR	36	0	30	0	40	30
TOTAL	27	46	56	20	28	44

Table XXI presents the completion details for each component as a percentage, as of February 2020. In Thiruvananthapuram (TVM), 54% of water supply (WS) projects, 46% of sewage (SEW) projects, 71% of stormwater drainage (SWD) projects, 50% of urban transport (UT) projects, and 33% of park projects have been completed. In Kollam (KLM), 38% of water supply projects, 0% of sewage projects, 23% of stormwater drainage projects, 25% of urban transport projects, and 60% of park projects have been completed. In Alappuzha (ALP), 44% of water supply projects, 0% of sewage projects, 48% of stormwater drainage projects, 29% of urban transport projects, and 14% of park projects have been completed. Similar completion percentages can be observed for the remaining urban areas and components listed in the table. Overall, the average completion percentages across all urban areas are 27% for water supply projects, 46% for sewage projects, 56% for stormwater drainage projects, 20% for urban transport projects, and 28% for park projects. These completion percentages provide insights into the progress made in completing different components of the projects in each urban area.

ANALYSIS AND INTERPRETATION

Here we can test the homogeneity of project completion – w.r.to different components & also w.r.to the different urban areas. Consider two sets of hypotheses.

H_{01}: Overall 9 urban areas are homogeneous in case of AMRUT project completion

H_{11}: they are not homogeneous.

H_{02}: Overall 5 urban AMRUT project components are homogeneously treated, while considering the completion time of the projects, against

H_{12}: they are not homogeneous.

TABLE XXII DISCRIPTIVE STATISTICS

Summary	TVM	KLM	ALP	KOC	TCR	GUV	PKD	KOZ	KNR	WS	SEW	SWD	UT	PARK
Average	46.2	33.2	21	30.2	25.4	12.6	20	8	21.2	23.2	5.1	47.3	17.8	27.6
Variance	258.7	651.7	333	542.7	730.3	793.8	464.5	170	387.2	353.2	235.1	463	288.4	401.8

Table XXII presents the average completion percentages for various components in each urban area. In Thiruvananthapuram (TVM), the averages are as follows: 46.2% for water supply (WS), 33.2% for sewage (SEW), 21% for stormwater drainage (SWD), 30.2% for urban transport (UT), and 25.4% for park projects. Kollam (KLM) shows average percentages of 5.1% for WS, 47.3% for SEW, 17.8% for SWD, 27.6% for UT, and 12.6% for park projects. Alappuzha (ALP) exhibits averages of 21% for WS, 23.2% for SEW, 5.1% for SWD, 47.3% for UT, and 17.8% for park projects. Similar patterns can be observed for the remaining urban areas and components.

The variances presented in the table indicate the degree of dispersion or variability in the completion percentages for each component across the urban areas. Higher variance values suggest greater variability in the completion progress. In summary, these statistics offer valuable insights into the average completion percentages and variations in the completion progress for different components in each urban area, providing a comprehensive overview of the ongoing projects.

TABLE 23. ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Rows	5181.6	8	647.7	2.368563	0.039732	2.244396
Columns	8576.978	4	2144.244	7.841251	0.00016	2.668437
Error	8750.622	32	273.4569			
Total	22509.2	44				

Based on the insights derived from Table 23, both null hypotheses have been convincingly rejected. The p-values associated with the tests for AMRUT project completion and the treatment of AMRUT project components fall below the predetermined significance level (α) of 0.05, specifically registering at $p = 0.0397$ and $p = 0.00016$, respectively. These results imply compelling evidence that the 9 urban areas scrutinized in the study do not exhibit homogeneity concerning AMRUT project completion. Moreover, the analysis underscores that the 5 AMRUT project components undergo disparate treatment in terms of completion time across these urban areas. The implications of these findings are significant, suggesting the presence of variations and inconsistencies in the completion of AMRUT projects among the studied urban areas, as well as divergent approaches in handling different project components. It indicates the likelihood of underlying factors or local conditions contributing to the observed differences in project completion and treatment. Further in-depth investigation and analysis are warranted to pinpoint the specific factors influencing these variations and to attain a comprehensive understanding of the reasons behind these discernible discrepancies.

CONCLUSION

Over the past decade, the landscape of urbanization in India has witnessed a notable surge in the establishment of large-scale new towns, ushering in a rapid pace of urban growth. The burgeoning urban population presents challenges in delivering sufficient urban infrastructure, civic amenities, and reproductive and child health services. Given that urban areas now contribute approximately 63% to India's GDP, it becomes imperative to confront the strain on physical and civic infrastructure systems in cities, recognizing their potential as drivers of the Indian economy. However, urban centers grapple with a deficit in civic amenities and lag behind in quality-of-life parameters, contending with issues such as poverty, a dearth of affordable housing, traffic congestion, overcrowding, environmental degradation, and air pollution. To tackle the multifaceted challenges arising from urbanization, the Central Government has introduced several centrally initiated urban development programs, including JNNURM, AMRUT, and the Smart Cities Mission. These programs are designed to instigate urban reforms and policy changes by allocating funds and empowering states and Urban Local Bodies (ULBs). AMRUT, with its focus on five core areas, positions states as equal partners in project planning and implementation, fostering the principles of cooperative federalism. This approach marks a departure from the earlier practice of project-by-project sanctions. The concept of smart cities constitutes another transformative mission aimed at addressing contemporary urban issues and ensuring a sustainable future. Further research is warranted to establish parameters, definitions, and guidelines for the development of new cities through greenfield projects. Regular reviews and fortification of project progress and reform implementation by the Central Government are imperative for effective execution. Moreover, there is a pressing need to integrate more sustainable development projects as supplementary components within these schemes. The convergence of AMRUT and the Smart Cities Mission holds pivotal significance for sustainable development and addressing local issues. Additionally, analyzing the impact of these projects on the socio-economic quality of urban residents emerges as a crucial area of focus for comprehensive urban planning and development.

REFERENCES.

1. Archana Aravindan & Prasanth C B (2018), Changing Paradigm of Kerala's Urbanisation Model with Special Reference to JNNURM at Eranakulam District, International Journal of Management Studies, DOI : 10.18843/ijms/v5iS1/02.
2. Bhagat, R. B. (2018) Urbanisation in India: Trend, Pattern and Policy Issues, IIPS Working Paper No. 17
3. Chetan Vaidya(2013), Urban Innovations in India,"India as a Pioneer of Innovations Conference",University of Pennsylvania, Philadelphia, November 14-15, 2013
4. Chatterjee, S., & Mukherjee, S. (2015). Urbanization in India: A Review of Trends, Patterns, and Policy Implications. Economic Affairs, 60(3), 477-490.

5. David Sadoway, Govind Gopakumar, Vinay Baindur, Madhav G Badami(2018), JNNURM as a Window on Urban Governance Its Institutional Footprint, Antecedents, and Legacy, Article in Economic and political weekly · January 2018
6. Gupta, A., & Shukla, A. (2019). Urbanization and Health in India: A Comprehensive Literature Review. Journal of Urban Health, 96(6), 813-826.
7. Govind Gopakumar(2014), Intrusiveness of Urban Renewal in India: JNNURM as a development fix, Canadian journal of development studies · March 2014
8. Jha, S., & Bhatia, S. (2018). Dynamics of Urbanization and Its Socioeconomic Implications: A Review of Contemporary Studies in India. Regional Studies in Marine Science, 22, 100669.
9. Kundu and Samantha (2010), Redefining the Inclusive Urban Agenda in India: A Critical Appraisl, Economic and Political Weekly volume XLVI No 5, January 29,2011.
10. Prasanth C B & Praseeja C B (2016), A Study On Urbanization: Distribution Fitting On City Size And Urban Population Characteristics Analysis, International Journal of Informative & Futuristic Research (IJIFR), 1780-1793, http://ijifr.com/searchjournal.aspx.
11. Prasanth C B & Praseeja C B (2017),A Markov Chain Model for the Demographic Study: A Case Study on Urbanization, International Journal of Mathematics & Computation, Volume 28, Issue Number 4
12. Russell M. Smith& Prasad Pathak(2018), Urban Sustainability in India: Green Buildings, AMRUT Yojana, and Smart Cities. In book: Metropolitan Governance in Asia and the Pacific Rim, DOI: 10.1007/978-981-13-0206-0_9
13. Sinha, R., & Agarwal, S. (2017). Urbanization and its Impacts on Environment: A Critical Review. International Journal of Environmental Science and Development, 8(1), 1-6.
14. Singh, A., & Verma, A. (2020). Urbanization and Economic Growth in India: A Critical Review of Empirical Evidence. Review of Urban & Regional Development Studies, 32(1), 23-39.
15. Vlahov D, Freudenberg N, Proietti F, et al.(2007) Urban as a determinant of health. J Urban Health.;84(3 Suppl):i16–i26. doi:10.1007/s11524-007-9169-3
16. http://amrut.gov.in/
17. https://amrutkerala.org/