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WASH ECONOMY REPORT
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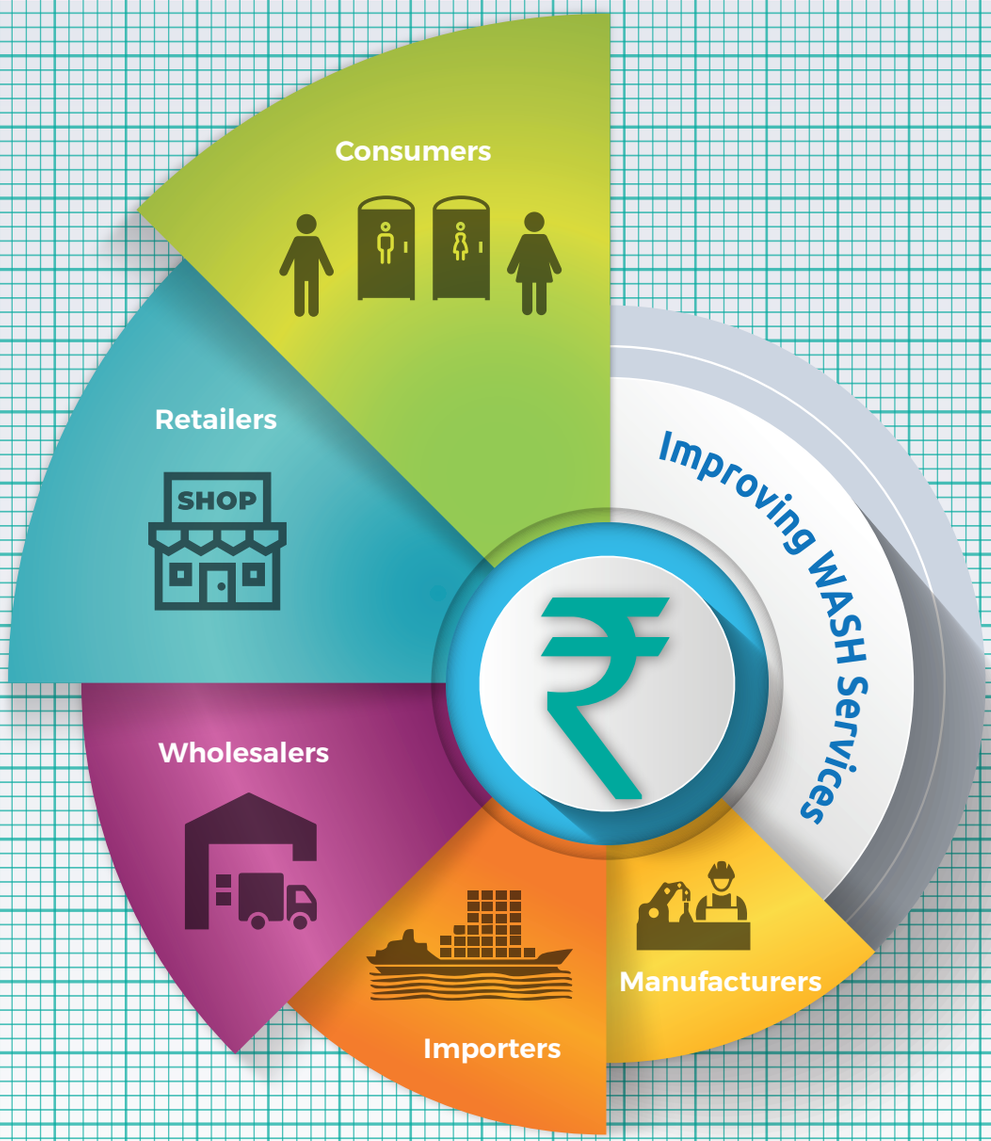

WATER SANITATION HYGIENE

IHUWASH

Innovation Hub for Urban Water, Sanitation and Hygiene Solutions in India

Supported by USAID

WASH ECONOMY REPORT 2018
National Institute of Urban Affairs (IHUWASH Project), 2018

Supported by USAID
USAID's Urban WASH Alliance Partnership Program
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WASH ECONOMY REPORT

Understanding the Economy of WASH in Faridabad, Udaipur, Mysuru

Supported by USAID
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WATER SANITATION HYGIENE

IHUWASH

Innovation Hub for Urban Water, Sanitation and Hygiene Solutions in India

2018

Contents

List of Abbreviations

ADB - Asian Development Bank

AMRUT - Atal Mission for Rejuvenation and Urban Transformation

FGD - Focus Group Discussions

FMCG - Fast Moving Consumer Goods

GoI - Government of India (GoI)

HUDCO – Housing and Urban Development Corporation

IHUWASH - Innovation Hub for Urban Water, Sanitation and Hygiene Solutions

JICA - Japan International Cooperation Agency

JnNURM - Jawaharlal Nehru National Urban Renewal Mission

KII - Key Informant Interviews

MCC - Mysuru City Corporation

MCF - Municipal Corporation Faridabad

MoHUA - Ministry of Housing and Urban Affairs

NGO – Non- Governmental Organization

NIUA - National Institute of Urban Affairs

NSDC - National Skill Development Corporation

NULM - National Urban Livelihood Mission

SAAP - State Annual Action Plan

SBM - Swachh Bharat Mission

SDG - Sustainable Development Goals

ULB - Urban Local Bodies

UMC - Udaipur Municipal Corporation

USAID - United States Agency for International Development

WASH - Water, Sanitation, and Hygiene

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Acknowledgement

The WASH Economy Report has been prepared under the Innovation Hub for Urban Water, Sanitation and Hygiene Solutions (IHUWASH) project supported by the United States Agency for International Development (USAID). I sincerely thank USAID for supporting the IHUWASH project. I extend my special thanks to Mr. Anand Rudra, Senior WASH Advisor, USAID who stimulated critical discussions on various components of the project from time to time.

The report is an effort to understand the size and scale of the businesses and livelihood associated with the Water Sanitation and Hygiene (WASH) sector in the three project cities of Faridabad, Mysuru, and Udaipur. The WASH economy report was conceptualized under the IHUWASH project with the purpose to unwrap the WASH sector's economy using in-depth information, data, and insights, and to analyse its contribution towards the country's economy. I would like the opportunity to thank Mr. Anand Iyer, Chief Project Manager, National Institute of Urban Affairs (NIUA) and Mr. Uma Maheswaran Mandi from partnering Incubation Centre, Indian Institute of Management, Udaipur, for providing a valuable contribution in conceptualizing and defining the scope and methodology for undertaking the WASH economy study.

I extend my sincere thanks to the officials of the municipal corporation of Faridabad, Udaipur and Mysuru for providing the data and support in carrying out the study in their respective cities. Credit is also extended to WASH Labs of IHUWASH project cities and all the stakeholders who participated and given their suggestions in consultation workshops organized in Udaipur and Mysuru.

The present document is synthesized from the three separate studies carried out in the three IHUWASH project cities; Faridabad, Udaipur, and Mysuru. I extend my sincere thanks to Dr. Sandeep Thakur, Senior Research Officer, NIUA for his valuable inputs in the initial version of the report to improvise key sections. I would like to express my gratitude to Dr. Victor Shinde, Mr. Lovlesh Sharma and Dr. Umamaheshwaran Rajasekar from NIUA for providing their valuable inputs in fine-tuning the content of the report.

I would also like to acknowledge the efforts of a team of experts from Tide Technocrat Ltd., Bangalore; Centre for Integrated Development, Ahmedabad, and pManifold Business Solutions, Nagpur, who were appointed for the primary data collection in Mysuru, Udaipur, and Faridabad respectively. Their efforts for this unique assignment is worth highlighting. I sincerely acknowledge the role of Dr. Girija Bharat, Director, Mu Gamma Consultants Pvt. Ltd. for peer reviewing the report.

The IHUWASH team at NIUA and in the respective project cities constantly works to upscale the existing innovations in the WASH sector through research and consultation with various organizations in the project cities. Their support in compiling, editing, and finalizing this document is noteworthy. Last but not the least, efforts of the dedicated design team at NIUA deserves a special mention for aesthetically representing the report.

Prof. Jagan Shah
Director, NIUA

Preface

Although, the knowledge on Water, Sanitation, and Hygiene (WASH) economy market is evolving in India, especially considering the existing thrust given by the Government to improve the sector; organized information available to determine its quantum and scale at which it operates is highly warranted.

The initial sections of the report briefly explain the economic aspects of the sanitation and snapshot of WASH economy in the country. It narrates the magnitude of economic losses associated with poor sanitation in developing countries. The section also highlights previous and current government programmes in which the expenditure in the WASH sector has occurred.

The primary research for understanding the WASH economy was done in the three project cities. The WASH value chain is quite complex and involves expenditure at multiple levels and by a number of stakeholders; it was important to determine the boundary conditions to prepare the present WASH economy study. A brief methodology is presented to explain the rationale and approach adopted to collect the information related to this report.

The Ministry of Housing and Urban Affairs, Government of India has launched important missions like Swachh Bharat Mission (Urban), Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and Smart Cities Mission to improve the urban WASH sector. A dedicated section on expenditure incurred under these missions in the three project cities has been presented to appreciate the scale of expenditure in the WASH sector.

The core section of the report is mapping the WASH sector market economy in the project cities. Since sanitary hardware and fast moving consumer goods (FMCG) such as toiletries are consumed mostly in the domestic sector; the current assessment is limited to them being evaluated from formal and informal markets as well as services offered in the sector. The manufacturing, supply chain, services and livelihood associated with the WASH sector is also unpacked in this section. With the huge penetration of internet and smartphones in India, online trading and service delivery is on the rise. With the changing lifestyles and capacity to spend more, to purchase innovative WASH products; it is essential for service providers like masons and plumbers as well as sanitary workers to build their capacities towards the changing realm of service delivery mechanism. For this, government and civil society groups conduct various programmes. The report highlights the situation in the three project cities on this.

In order to reinforce the future attempts to map the WASH economy of the country, a set of recommendations are mentioned in the Way Forward in three broad categories Government, Private Sector and Consumers.

The report is a novel effort in understanding the economy of WASH albeit focused on the three cities of Udaipur, Faridabad, and Mysuru. It is evident that WASH as a sector has a resounding impact on the local economies of these cities. As such, similar efforts in understanding the sector and its concomitant impacts on the gross domestic product (GDP) and livelihood at the national level will be worth to attempt.

Executive Summary

Water, Sanitation, and Hygiene (WASH) sector supports a considerable bulk of the regional business potential; thereby, generating significant formal and informal livelihood options, and contributing to the overall economy. The present study is an effort towards understanding the WASH Economy in the cities of Faridabad, Mysuru and Udaipur in India and has been explored through the project 'Innovation Hub for Urban Water, Sanitation and Hygiene Solutions' (IHUWASH), supported by United States Agency for International Development (USAID). This project is being implemented by National Institute of Urban Affairs (NIUA) and is supported by Ennovent, Austria.

The project's extensive assessment highlights the size and contribution of the WASH economy by quantifying both. The results of this study are expected to improve the urban WASH sector performance through incubation and acceleration of innovative solutions, technologies, programs and service delivery models within a collaborative framework by building partnerships at local level in the three cities.

The project objectives are not only directly contributing to Government of India's flagship programs like Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Swachh Bharat Mission (SBM) and SMART City Programs; the objectives are also aligned with the Sustainable Development Goals (SDG) SDG-6 of Clean Water and Sanitation for all.

The present study involved data collection from primary and secondary sources. While secondary research involved review of existing studies and research work undertaken on WASH Economy at the national level, primary data was collected at the city level via surveys, group discussions and interviews.

The assessment of the WASH Economy study at the respective city levels included:

- Secondary research on the WASH sector product market at city and regional level
- Stakeholder mapping and analysis of people engaged in WASH sector at city level
- Collection of primary data using survey questionnaire and other techniques like focus group discussions (FGDs) from households, key manufacturers, wholesalers and retailers in and around the respective project geographies dealing in sanitary hardware business
- Exploration of key WASH products consumer markets, including supply chain and assessment of demand for WASH products in various socio-economic strata
- Assessment of livelihood options in terms of employment generated by WASH market in the formal and informal sectors (such as plumber and masons). This also included gender analysis
- Assessment of gaps to access sanitation products and services, skill levels of the sanitation service providers and extent of outreach of national schemes such as Skill India Mission

Primary data collection involved:

- Key Informant Interviews (KII) with manufacturers, wholesalers, and retailers, NGOs, Municipal Authorities as well as households
- Interviews with service sector representatives including plumber associations and masons in the city

The primary data collection was done by ensuring adequate representation of key Sanitary Hardware/FMCG product manufacturers and wholesalers. For retailers, key market places in the particular city were considered and to verify

consumption of products from the consumer's end, household samples were taken from different income strata. The study was not meant to focus on gathering extensive qualitative information on household needs, beliefs or practices related to sanitation, but instead to understand spending patterns as well as related services of WASH products. Nevertheless, a limited number of qualitative analysis contextual questions that interfaced with sanitation supply chains were also included.

The recommendations are predicated on a set of data points, which can be debated and tested. However, there is a clear case for scaling up engagement of the private sector in the WASH sector, in support of universal access. But making that case convincing, and refining it, requires much stronger data – for example to quantify and qualify the impact on financial bottom-lines from investing in WASH in the workplace and supply chain. This can further be extended to the social and environmental bottom-lines to get a holistic perspective of private sector's role and contribution to the WASH sector.

Water, Sanitation and Hygiene sector market assessment in the three project cities highlights the issues faced by various stakeholders and a way forward for WASH economy assessment at the country level. Assessment gives significant takeaways and insights on the potential of WASH product development, market enhancement and WASH related services. The study revealed that domestic WASH businesses have considerable market knowledge (local) and penetration too. However, there is a lack of capacity for innovative WASH product development, marketing strategies, and access to finance for development of products. Importantly, the services rendered for the WASH sector needs attention to scale up the services. Thus, scaling domestic and small-scale private sector development in WASH sector must be the key focus for Government (Central and State) and WASH agencies. It is also unlikely that the domestic and small-scale private sector alone can provide all the solutions. Established larger companies must offer both resources and know-how to help address critical bottlenecks.

Although, the knowledge on WASH economy market is significant; especially considering the existing thrust given by the Government to improve the sector, systematic information available about its quantum and scale at which it operates remains neglected. In order to strengthen the WASH economy of the country, a set of recommendations have been articulated in the report. They are presented in three broad categories: Government, Private Sector and Consumers.

1. Background

The United States Agency for International Development (USAID) supported project 'Innovation Hub for Urban Water, Sanitation and Hygiene Solutions' (IHUWASH), is being implemented by National Institute of Urban Affairs (NIUA), a premier research institute under the Ministry of Housing and Urban Affairs (MoHUA), Government of India (GoI). The project's implementation is supported by Ennovent, Austria, an organization which is a catalyst for businesses with sustainable solutions for low-income markets. IHUWASH supports the development of scalable solutions for urban WASH in India within the National, State and City Framework.

The Water, Sanitation, and Hygiene (WASH) sector supports niche manufacturing industries and service sector organizations that contribute to the regional economy and ultimately have a share in the country's GDP. A wide variety of sanitary hardware products are being manufactured and made available in the market in addition to this, significant livelihood is also dependent on the WASH sector. Even though the knowledge/ information on the WASH Economy Market is growing rapidly, especially considering the existing thrust by the Government of India to improve the sector, the need for organized information about quantum of business at scale is required for better planning and implementation of various programs. A need to furthermore study and understand the WASH Economy under IHUWASH project was felt.

Mapping an existing business (formal/informal) catering to WASH sector consumer market and the livelihoods associated with it at country level requires analyzing huge data, interaction with all relevant stakeholders including Government and Non-Government. Therefore, to begin with such an exercise, investigating WASH Economy in three-project cities was found most appropriate. The cites chosen were: Faridabad (Haryana), Udaipur (Rajasthan) and Mysuru (Karnataka). The salient features of the three cities is mentioned in Table1 and the Sanitation Service Level Delivery in these cities as per Swachh Survekshan 2017 is presented in Table 2.

The overarching goal of this project was to diagnose the WASH sector from the viewpoint of its economic aspects as well as from the livelihood perspective in the project geographies. The assessment highlighted the size and contribution of the WASH economy. This is expected to improve the urban WASH sector performance through incubation and acceleration of innovative solutions, technologies, programs and service delivery models within a collaborative framework by building partnerships at local level. The project implements this theory of change in the three cities.

Table 1: Salient Features of the IHUWASH Project Cities

Parameters	Faridabad	Mysuru	Udaipur
Type of City	Industrial	Tourist	Tourist
Geographical area (km²)	742.90	128.42	64
Population (as per Census 2011)	1,404,653	1,014,227	4,51,000
Swachh Survekshan rank in 2018 (4203 cities and towns)	217	8	85
Swachh Survekshan rank in 2017 (434 cities and towns)	88	5	310
Swachh Survekshan rank in 2016 (73 million-plus cities)	51(Acceleration required)	1 (Leader)	Not participated
Swachh Survekshan rank in 2014 (476 cities and towns)	379	1	417
Overall score in 2018 (Out of 4000)	3,144	3,540	2,623
National missions covering WASH Schemes	SBM, AMRUT, Smart City	SBM, AMRUT	SBM, AMRUT, Smart City

Table 2: Sanitation Service Delivery and Infrastructure in the IHUWASH Project Cities (as per Swachh Survekshan 2017)

Parameters	Faridabad	Mysuru	Udaipur
Total Water Supply (MLD)	262	190	83
Population with Water Connections (%)	62	71	81.3
Per Capita Water Supply (LPCD)	107	122	115
Non-Revenue Water	51	66	-
Cost Recovery of Water Supply (%)	-	40	18
Population Using Individual House Toilets (%)*	89.1	98.1	93.8
Population Using Open Defecation (%)*	8.6	0.8	4.6
Population Using Public Toilets (%)*	2.2	1.0	1.6
Population Connected to Sewerage Network (%)*	49.9	96.2	15
Population having Septic Tanks (%)*	25.5	1.6	77.5
Approximate Wastewater Generation (MLD)	200	150	65
Wastewater Treatment Capacity (MLD)	160	156.6	20
Number of Public & Community Toilets	60	106	56

**Census 2011*

The project objectives are not only directly contributing to GoI's flagship programs like Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Swachh Bharat Mission (SBM) and SMART City Programs; the objectives are also aligned with the Sustainable Development Goals (SDG) SDG-6 of Clean Water and Sanitation for all, as presented in Figure 1.

Figure 1. IHUWASH project alignment with SDG- 6

Source: NIUA, 2018

2. Aim of the Report

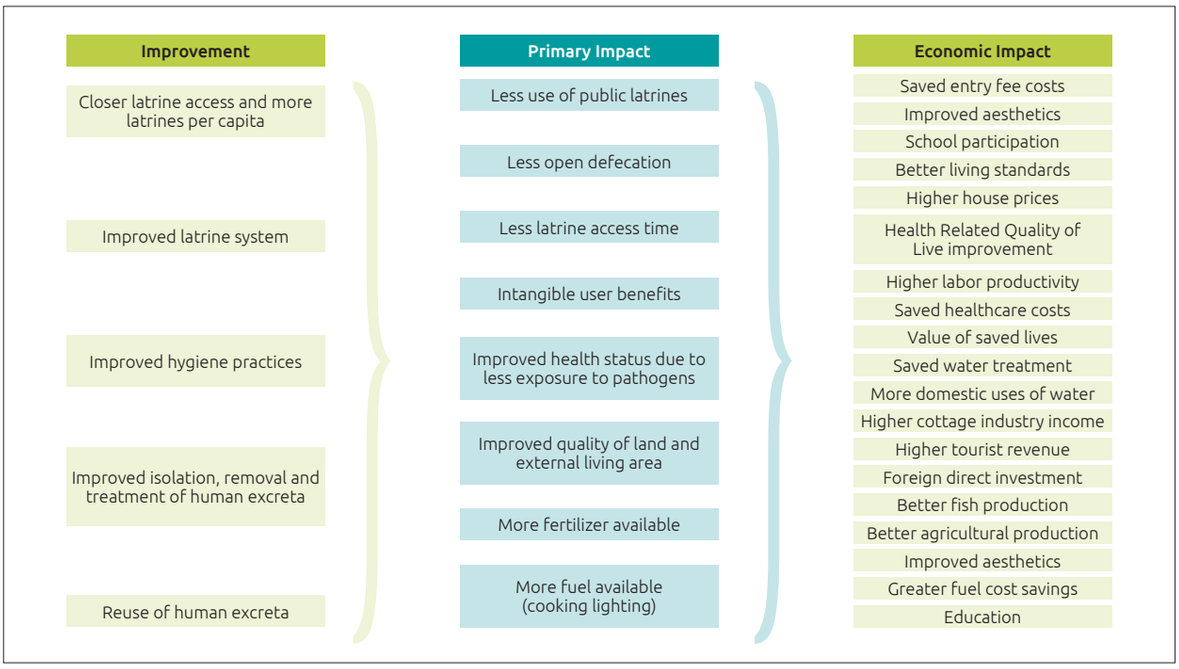
Water, Sanitation, and Hygiene (WASH) sector supports considerable size of the business and contributes to the overall economy. The business of the sector also generates significant formal and informal livelihood options. There is a wide range of products being manufactured and sold in the sanitary hardware market which can be categorized into essential and desirable products for the consumers as per their affordability. Moreover, the types of products available in the market are manufactured locally as well as by internationally recognized brands. There is also a parallel informal market for sanitary hardware products (second hand/defective pieces) which goes unnoticed, but is a major contributor in terms of business and livelihood aspects. Although, the knowledge on WASH economy market is significant; especially considering the existing thrust given by the Government to improve the sector, systematic information available about its quantum and scale at which it operates remains neglected.

Therefore, under the project, study of public sector expenditure, existing business (formal/informal) catering to the need of WASH sector consumer market and the associated livelihood options in cities under the purview of IHUWASH project have been undertaken. The key findings of this study have been shared in the Sanitation Conclaves held at Udaipur and Mysuru, which engaged key stakeholders and their inputs have been incorporated in the report.

3. Economic Aspects of Sanitation

The magnitude of economic losses associated with poor sanitation in developing countries has been substantial. Inadequate sanitation has caused India considerable economic losses, equivalent to 6.4 percent of India's GDP in 2006 at US$53.8 billion. The health-related economic impacts of inadequate sanitation at US$38.5 billion accounted for the largest category of impacts, while access time (productive time lost to access sanitation facilities or sites for defecation) and drinking water-related impacts were the other two main losses at US$10.7 billion and US$4.2 billion, respectively. The primary impacts and resulting economic impact associated with improved sanitation options are depicted in Figure 2.

Figure 2: Economic Impact of Improved Sanitation



Source: Hutton et al. 2008.

Note: "Intangible user benefits" include comfort, convenience security, privacy. Omproved asthetics include visual effects, smell.

4. Glimpses of WASH Economy in India

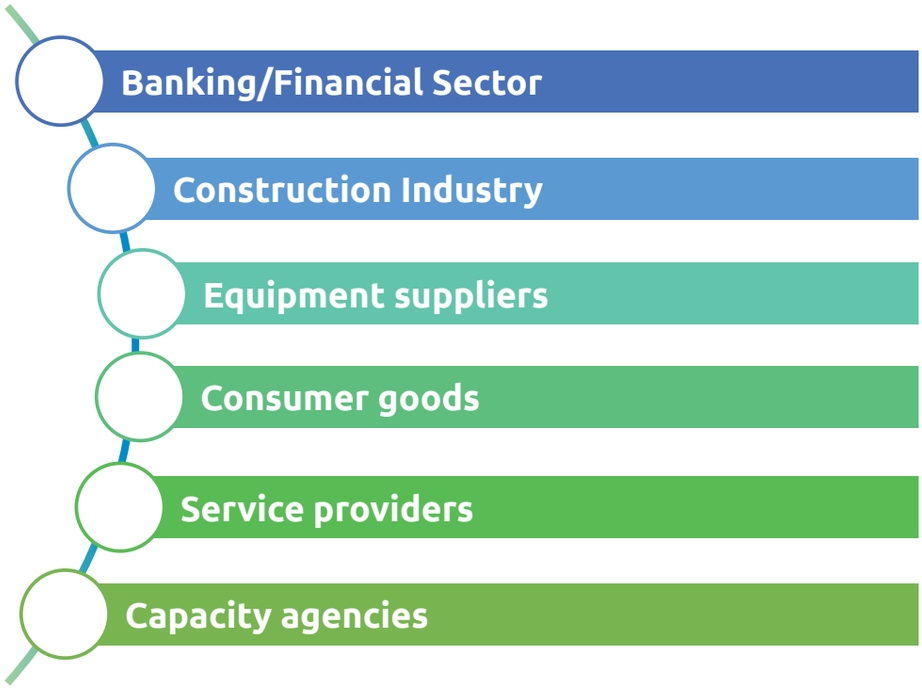
Water supply, sanitation and hygiene are key elements for doing business the world over in delivering WASH services; selling WASH-related products as a core business activity. WASH underpins productive workforces, societies and economies. WASH sector therefore, cuts across multiple dimensions of business viability including operations, marketplace, supply chains and workforce. There are multiple ways for business to benefit from WASH, and for WASH to be supported by business.

In India, investment in the urban water supply and sanitation sector has increased during the first decade of the 21st century. It was mainly driven by increased central government grants made available under Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and funding from financial institutes such as Asian Development Bank (ADB), The World Bank and Japan International Cooperation Agency (JICA)[1]. The investment required in the sector estimated to be INR 620,000 crore (USD 129 billion)[2]. While government initiates programs of the nature of Swachh Bharat Mission (SBM), their implementation is undertaken by multiple stakeholders with consequences on various industry subsectors.

During the implementation of SBM; when it was disaggregated into its main components, it was found to have diverse positive industry effects such as:

[1] www.jica.go.jp/india/english/activities/ accessed on 4th July 2018

[2] Water Sector in India, 2010, KPMG (Accessed online at https://www.kpmg.de/docs/Water_sector_in_India.pdf accessed on 4th July 2018)



The potential market size of the WASH industry in India is estimated to be USD 32 billion annually. Box -1 and Figure 3 have further details.

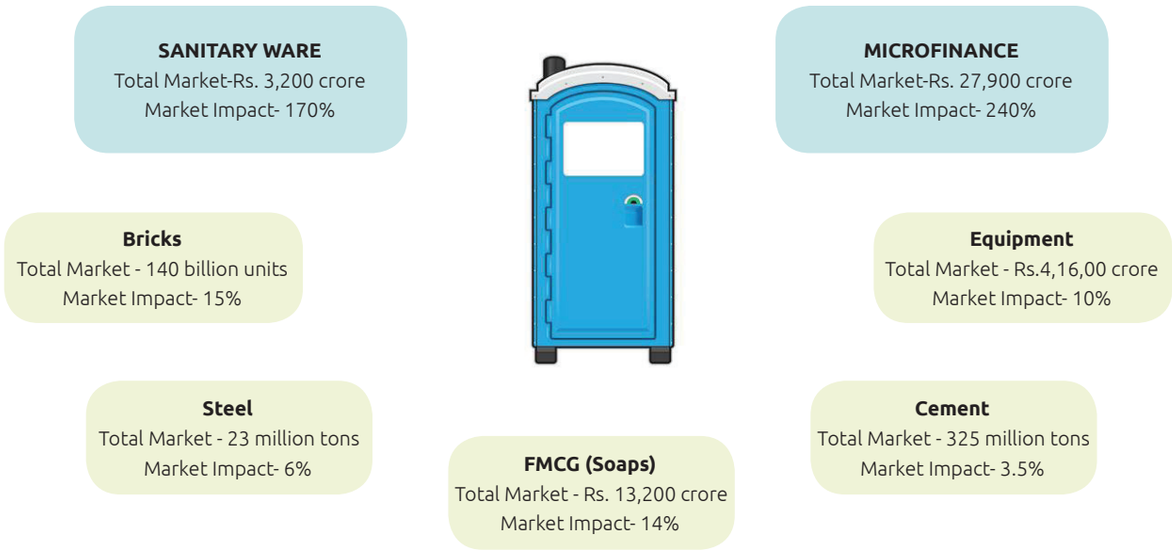
BOX-1 Estimates of Indian Sanitation Economy

Currently, the sanitation economy is a US $32 billion annually in India, and is all set to double (US $62 billion) by 2021. Specifically, the toilet construction domain is expected to grow from the present $6 billion to $14 billion by 2021. Aligned with it, other growth sectors include maintenance and cleaning of the WASH systems classified into three categories as below:

- **Construction**
  - The market for construction of individual household toilets was based at 2.2 million toilets in 2017
  - The average cost of building one-unit basic sanitary toilet in an urban household is estimated to be $615
- **Repair and maintenance**
  - The market for repair and maintenance was considered for ~84.8 million households which had toilets
  - Average annual cost of repair and maintenance of one individual household level toilet is estimated to be $46
- **Cleaning**
  - ~87 million individual household toilets built
  - The average cost of cleaning toilets in urban areas is $4.62 per month

Source: Toilet Board Coalition, 2017

Figure 3: Estimated Market Size of WASH Industry[3]



5. Approach and Methodology

The WASH sector is a complex one and comprises of several diverse elements. The present study involved data collection from primary and secondary sources. While secondary research involved review of existing studies and research work undertaken on WASH Economy at the national level, primary data was collected at the city level from surveys, group discussions and interviews.

The broad scope of the assessment of WASH Economy study at city level is:

- Secondary research on the WASH sector product market at city and regional level
- Stakeholder mapping and analysis of people engaged in WASH sector at city level
- Collection of primary data using survey questionnaire and other techniques like focus group discussions (FGDs) from households, key manufacturers, wholesalers and retailers in and around the respective project geographies dealing in sanitary hardware business
- Exploration of key WASH products consumer markets, including supply chain and assessment of demand for WASH products in various socio-economic strata
- Assessment of livelihood options in terms of employment generated by WASH market in the formal and informal sectors (such as plumber and masons). This also included gender analysis
- Assessment of gaps to access sanitation products and services, skill levels of the sanitation service providers and extent of outreach of national schemes such as Skill India Mission

The study was undertaken in three project locations, viz. Faridabad (Haryana), Mysuru (Karnataka) and Udaipur (Rajasthan). It covered two key segments of WASH industry - Sanitary Hardware and Fast Moving Consumer Goods (FMCG) products related to hygiene. The most common products found at retailers, which form major segments in the WASH market are given in Table 3.

[3] Swachh Bharat: Industry Engagement – Scope and Examples, Centre for Policy Research & Confederation of Indian Industry

Table 3: WASH Products List for WASH Market Assessment in IHUWASH Project Cities

Sanitary Hardware Products	FMCG
Cisterns	Sanitizer
Overhead tanks (PVC only)	Liquid hand wash
PVC/GI pipes	Toilet/bathroom cleaner (branded/ non-braded)
Toilet pans	Sanitary Napkin
Toilet/ Bathroom fittings	Phenyl
Types of Faucets	Bathroom fresheners
Valves - ballcock/ others	FMCG products at general/medical stores
Wash basins and others	

Source: NIUA, 2018

Primary data collection involved:

- Key Informant Interviews (KII) with manufacturers, wholesalers, and retailers, NGOs, Municipal Authorities as well as households
- Interviews with service sector representatives including plumber associations and masons in the city

The primary data collection was done by ensuring adequate representation of key Sanitary Hardware/FMCG product manufacturers and wholesalers. For retailers, key market places in the particular city were considered and to verify consumption of products from the consumer's end, household samples were taken from different income strata. The study was not meant to focus on gathering extensive qualitative information on household needs, beliefs or practices related to sanitation, but instead to understand spending patterns as well as related services of WASH products. Nevertheless, a limited number of qualitative analysis contextual questions that interfaced with sanitation supply chains were also included. These questions helped to gauge the extent of the household's interaction with the sanitation service providers to understand the benefits and challenges faced by them in accessing sanitation solutions.

The key challenge in context to primary data collection was found to be the resistance of the sellers in sharing data in terms of turnover, extent of business growth and opportunities in the sector; therefore, it is quite possible that data provided by the retailers and wholesalers might be under-stated. Furthermore, all the interviews and discussions took place during day-time which are peak business hours in all the enterprises; therefore, it was difficult to engage respondents in interactions for longer durations resulting in the interviewers paying multiple visits to the same sources in order to collect the data.

6. Expenditure in WASH Sector by Government

The WASH sector is highly dependent upon public funding under infrastructure development projects as it requires large capital investment. There are sub-sectors of the sanitation economy that include: sanitation market, sanitation equipment, sanitation products, sanitation services (Human Resources), sanitation education (awareness), etc. The Water and Sanitation Program of the World Bank has estimated that the annual sanitation market is expected to grow from Rs. 300 billion (US$6.6 billion) in 2007, to Rs. 683 billion (US$15.1 billion) in 2020[4].

The Government of India at the Central, State

[4] Economic Impacts of Inadequate Sanitation in India, 2011, WSP, The World Bank

and Local levels is implementing key flagship programs such as Swachh Bharat Mission (Urban), AMRUT and SMART City. An overview of these programs in terms of expenditure towards WASH sector products in the IHUWASH project cities of Faridabad, Mysuru and Udaipur is presented in this report.

6.1 Atal Mission for Rejuvenation and Urban Transformation - AMRUT

The AMRUT scheme was launched by the Hon'ble Prime Minister of India in June 2015, with the focus to strengthen the WASH infrastructure that could ensure adequate and robust sewage networks, septage management and water supply for urban transformation. The purpose of AMRUT mission is to ensure that every household has access to a tap, with assured supply of water, and a sewerage connection. The Mission aims to cover 500 towns and cities in India which have a population of over one lakh (100,000) with notified Municipalities. All project cities viz. Faridabad, Mysuru and Udaipur are covered under AMRUT. Total outlay for AMRUT mission is Rs. 50,000 crores for five years (2015-16 to 2019-20). The project fund is divided between Centre and States/ UTs in an equitable formula in which 50:50 weightage given to the urban population of each State/UT and number of statutory towns.

Udaipur, Rajasthan

Rajasthan was the first state in the country to submit their State Annual Action Plan (SAAP) under AMRUT. Udaipur, an IHUWASH project city is a key city of Rajasthan. The State level allocation under AMRUT for Rajasthan for the year 2015-16 is given in Table 4 and Fig 4 and that for Udaipur city is given in Table 4 and Fig 5.

Table 4: Sector-wise Fund Allocation for Rajasthan State and Udaipur City Under AMRUT

Sector	Rajasthan * (Rs crores)	Udaipur City** (Rs crores)
Water Supply	779	30
Sewerage & Septage Management	1,788	85
Drainage	460	5
Urban Transport	420	25
Open Space	145	5
Total	**3,592**	**150**

**Source: SAAP, Rajasthan State ** Source: AMRUT Website*

Mysuru, Karnataka

The IHUWASH project city for Southern India is Mysuru. A total outlay of INR 160 Crore was initially allocated to the Mysuru City Corporation (MCC) under AMRUT to ensure that every household has access to a tap, with assured

Table 5: Allocation of Fund over Mission Period in Mysuru (all units in INR crore)

Year	2015-16	2016-17	2017-18	2018-19	2019-20
Water supply	50	50	35	15	6
Sewerage	-	-	-	-	-
Storm water drain	-	-	-	-	-
Green space and Park	0.5	0.5	1	1	1
Urban Transport	-	-	-	-	-
Total fund flow (Year wise)	50.5	50.5	36	16	7
Total project fund	**160 Crores**				

Table 6: Revised Allocation of Fund over Mission Period in Mysuru (all units in INR crore)

Sector	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Water Supply	50	77.6	58.78			186.38
Green space and Park	0.5	0.77	2.73			3.5
Total funds allocate to MCC						**189.98**

Source: SAAP, Karnataka

Figure 4: Sector-Wise Fund Allocation in Percentage Under AMRUT Mission for Rajasthan State

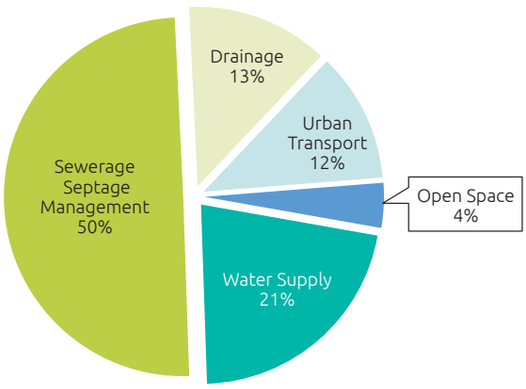
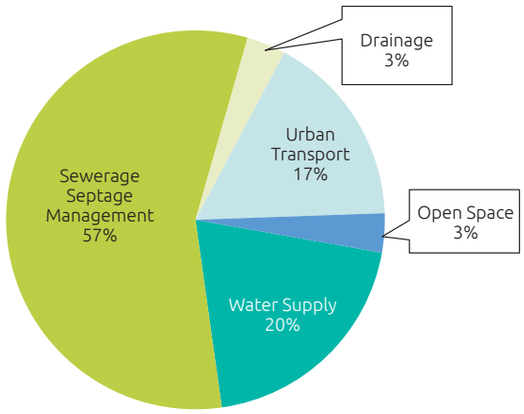


Figure 5: Sector-Wise Percentage Fund Allocation Under AMRUT Scheme for Udaipur City



supply of water, and a sewerage connection. The amount was also allocated to increase the amenity value of cities by developing greenery and well-maintained open spaces to reduce pollution by switching to public transport or developing facilities for non-motorized transport. The project fund over the mission period allocated for MCC is as shown below in Table 5. The revised fund allocation is Rs 189.98 crore as summarized in Table 6.

During the first year of the mission, a total of INR 50 crore was allocated to increase household level coverage of direct water supply and INR 0.5 crore was allocated to increase per person park area. Projects identified for the year 2015-16 and 2016-17 under water supply are:

(i) Mobilization advance, Survey & Designing of new pipe line network
(ii) Rehabilitation of Water Supply Distribution Systems proportionately in the remaining 22 District Metering Areas (DMA)
(iii) Construction of Service Reservoirs
(iv) Project identified under Open Space and Park: Improvement of existing People's Parks

The estimated expenditure is shown in Table 7.

The focus of AMRUT is to achieve service level benchmarks, such as universal coverage in water supply, sewer connections, etc. In view of this, during the third year of the mission more projects

Table 7: Estimated Annual Cost of Schemes Under Water Supply Category for 2017-18

Sl. No.	2017-18- Water supply	Estimated annual cost
1	Improvement to Melapura water supply system	22.11
2	Improvement to Hongalli 3rd stage water supply system	3.74
3	Improvements to Improvements to HLR command area	0.33
4	Improvements to Hongalli 2nd stage water supply system	1.26
5	Improvements to Belagola water supply system	0.63
6	Construction of 10 LL capacity OHT, 15 m staging at Saraswathipuram	0.52
7	Improvements to Kabini water supply scheme	0.25
8	Construction of 13 ML capacity RCC MBR at HLR premises	8.9
9	Construction of 2 Nos. of 15 LL MDT at HLR and CSR Premises	4.62
10	Construction of 13 ML capacity RCC MBR at HLR premises	8.08
11	Rehabilitation of distribution system in DMA 0610	8.34
	Total	**58.78**

Table 8: Details of Allocation of Water Supply Projects in 2017-18 Under AMRUT in Mysuru

	Project Name	Amount INR (cr.)	DPR Prepara-tion	SLTC Approval	Work order	Amount disbursed till 2017-18 INR (cr.)
Water Supply						
1	Mobilization advance, Survey & Designing of new pipe line network	77.6	Y	Y	Y	**10.802**
2	Rehabilitation of water supply Distribution system proportionately in Balance 22 DMA's					
3	Construction of Service Reservoirs					
Open space and Park						
1	Improvement of existing People's Park	0.77	N	N	N	**0.108**

under water supply were identified to achieve the target. Details of the project and fund utilization for Mysuru is shown in Table 8.

Faridabad, Haryana

In the State of Haryana, 18 cities and towns have been covered under the AMRUT scheme. The IHUWASH project city of Faridabad is one among them, the other cities are: Gurgaon, Panchkula, Ambala Sadar, Yamunanagar, Karnal, Hisar, Rohtak, Panipat, Kaithal, Rewari, Bhiwani, Thanesar, Sonepat, Bahadurgarh, Palwal, Sirsa and Jind. The sector-wise breakup of consolidated investments for all the ULBs of Haryana for the years 2015-2020 in given Table 7. In the financial year 2016-17, a budget of INR 525.4 crores was allocated. The details of fund allocated and disbursement status of Faridabad is summarized in Table 9.

Table 9: Sector Wise Breakup of Consolidated Investments for Faridabad FY 2015 – 2020 (in INR crores) Under AMRUT

S.No.	Name of the ULB	Amount in Crores
1	Water Supply	55
2	Sewerage and Septage Management	200
3	Drainage	40
4	Urban Transport	0
5	Green Area Develop-ment	1.5
6	Reforms	0
	Total	**296.50**

Swachh Bharat Mission (Urban)

6.2 Swachh Bharat Mission (Urban)

The SBM (Urban) launched on 2nd October, 2014 aims at making cities free from open defecation and achieving 100% scientific management of

Table 10: Fund Allocation and Disbursement of AMRUT Fund in Faridabad (in INR crores)

Name of the ULB	Project name	Fund Flow							
		Amount INR (cr)	CCII		State		Fund Flow		Total funds flow to project
			Ap-proved amount	Dis-bursed	Ap-proved amount	Dis-bursed	Ap-proved amount	Dis-bursed	
Faridabad	Water Supply	35.50	11.83	**6.72**	23.67	**6.72**	0.00	0.00	**13.43**
	Sewerage and Septage Management	50.00	16.67		33.33		0.00	0.00	
	Drainage	13.00	4.33		8.67		0.00	0.00	
	Urban Transport	0.00	0.00		0.00		0.00	0.00	

Source: State Annual Action Plan: FY 2017 – 20

Table 11: Financial Progress with SBM (Urban)

Sl. No.	State/ UT	IHHL	CT	SWM	IEC	CB	Total
			Haryana				
1.	Mission Allocation	86.67	10.61	181.80	30.40	7.60	317.80
2.	Released	13.98	0.68	57.66	1.87	0.47	74.65
3.	Balance	72.69	9.93	124.15	28.53	7.13	242.43
			Karnataka				
1.	Mission Allocation	355.35	44.31	512.52	84.62	21.16	1,017.96
2.	Released	84.89	15.54	57.26	29.66	17.62	204.97
3.	Balance	270.46	28.77	455.27	54.96	3.54	813.00
			Rajasthan				
1.	Mission Allocation	225.01	35.73	363.46	65.012	16.5	705.462
2.	Released	166.51	41.8	344.26	34.09	8.47	594.25
3.	Balance	58.76	-5.45	19.20	30.92	7.782	111.1
			MOUD				
1.	Mission Allocation			12,186.51	365.57	243.70	609.27
2.	Released			4,785.15	247.85	24.56	272.41
3.	Balance			7,400.46	117.72	219.14	336.86
			TOTAL				
1.	**Mission Allocation**						**14,622.73**
2.	**Released**						**5,640.55**
3.	**Balance**						**8,982.18**

Source: Ministry of Housing and Urban Affairs

municipal solid waste in 4,041 statutory towns in the country. For urban areas, the mission is administered by the Ministry of Housing and Urban Affairs (MoHUA). The total fund allocation for SBM (Urban) is INR 62,009 crore for five year (2015-2020). The share of Government of India (GoI) as per approved funding pattern is INR 14,623 crore. In addition, a minimum additional amount equivalent to 25 percent of GoI's share of INR 4,874 crore shall be contributed by the States as State/ULB share. The balance funds are proposed to be generated through various other sources of fund e.g. Public-Private Partnership, Beneficiary Share, User Charges, Land Leveraging, Innovative Revenue Streams, Corporate Social Responsibility (CSR), etc. The details of state level allocation and disbursement status of funds of Haryana, Karnataka and Rajasthan is summarized in Table 11.

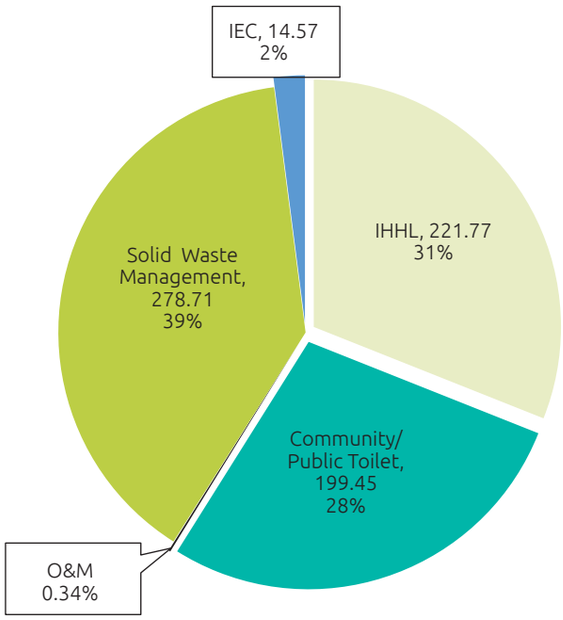
Table 12: SBM (Urban) Expenditure in Udaipur (2017-18)

Sector	Amount in INR Lakhs
Individual Household Latrines (IHHL)	221.77
Community/Public Toilet	199.45
Operation and Maintenance (O&M)	0.34
Solid Waste Management	278.71
IEC	14.57
Total	**714.84**

Source: Udaipur Municipal Corporation, 2018

The details of audited expenditure under SBM in the city of Udaipur in FY 2017-18 are presented in Table 12 and Fig 6.

Figure 6 Percentage Expenditure of SBM (Urban) in Udaipur (2017-18)



6.3 Smart City Mission

The Smart City Mission was launched by the Government of India in June, 2015, with the objective of promoting sustainable and inclusive cities that provide core infrastructure and give a better quality of life to its citizens with a clean and sustainable environment and application of 'Smart' Solutions.

The Smart City Mission is operated as a Centrally Sponsored Scheme (CSS), with financial support to the extent of INR 48,000 crores for five years i.e. on an average INR 100 crore per city per year. An equal amount needs to be contributed by the State/ ULB. Since the launch of the Smart City Mission, an amount of INR 9,939 crores has been released by GoI. Against this, 753 projects worth INR 24,511 crores have been completed or have at least begun work on-ground. Furthermore, about 287 projects worth INR 14,296 crores are in the tendering stages. For Faridabad till FY 2017-18, INR 196 crores have been released. The details of proposed projects in WASH Sector as per the Smart City proposal are summarized below in Table 13.

The details of sector wise funds allocated for Udaipur Smart City Project including allocation of AMRUT funds are summarized in Table 14.

Table 13: List of Proposed Projects in WASH Sector as per Smart City Proposal of Faridabad

Sl. No	Projects Details	Cost INR (in Crore)
1	Badkhal Lake rejuvenation	45
2	Smart meters for water connections	10
3	NRW Reduction	9
4	SCADA for water supply system	4
5	Online water quality monitoring System	1
6	Revamping of sewerage network	25
7	Waste water recycling for public areas, group housing arc green belt development	10
8	Rain Water Harvesting Proposal for Public Building /Schools/ Colleges/Parks	5.5
9	Smart Toilets	3.5
10	Improvements to Storm Water Networks	38
11	Underground cabling	276
12	Solar rooftops	29
13	Solar LED street lighting	10.68
14	Solid Waste Management	5

Source: http://smartcities.gov.in

Table 14: Sector Wise Fund Allocation Under the Smart City Mission Including AMRUT Udaipur

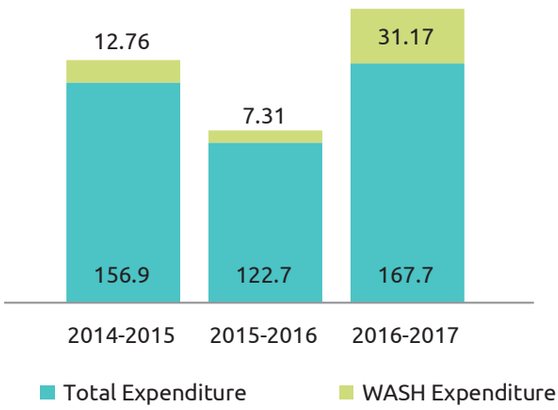
Sector	Amount in INR Cr
Water Supply	64.06
Sewerage	352.47
Electrical work	98.47
Road Restoration & Storm water drainage	78.57
Utility Duckting	51.07
SCADA	4.38
Solid Waste Management	9.01
Miscellaneous	67
Environment Sustainable	1.86
AMRUT Convergence in WASH	157.12
Total	**884.01**

Source: AMRUT website

6.4 WASH Expenditure in IHUWASH Project City Budgets

Urban Local Bodies (ULBs) allocate budget for WASH expenditure. The assessment of Municipal finance expenditure in WASH sector in the city of Udaipur for 2014-15, 2015-16 and 2016-17 is presented in Figure 7. The expenditure includes both ULB revenue as well as capital receipts under ongoing national and state programs as discussed above.

Figure 7: WASH Sector Expenditure by Udaipur Municipal Corporation



Source: Udaipur Municipal Corporation

The Mysuru City Corporation (MCC) presented a capital expenditure budget of INR 304.32 crores for the FY 2018-19. Table 15 summarizes the capital expenditure actuals for the FY 2016-17

Table 15: Share of WASH Under Capital Expenditure in Mysuru (in lakhs)

Sl. No	Particulars	Actuals for the year 2016-17	Revised Budget Estimate for the year 2017-18	Budget Estimate for the year 2018-19
1	Total WASH Sector Capital Expenditure	5,187.95	6,560.00	7,050.00
2	Total MCC Capital Expenditure[5]	15,920.00	29,328.00	30,432.00
3	% share of WASH Sector	32.6%	22.3%	23.1%

Source: Mysuru City Corporation

Table 16: Share of WASH Under Revenue Receipts in Mysuru (in lakhs)

Sl. No	Particulars	Actuals for the year 2016-17	Revised Budget Estimate for the year 2017-18	Budget Estimate for the year 2018-19
1	Total WASH Sector Revenue Receipts	6,324.30	6,641.00	7,745.00
2	Total Revenue Receipts[6]	36,939.00	39,658.00	45,110.47
3	% share of WASH Sector	17.1%	16.7%	17.2%

Source: Mysuru City Corporation

[5] Source – MCC Budget 2018-19
[6] Source – MCC Budget 2018-19

and 2017-18, and estimated budget for 2018-19 in WASH Sector.

For the FY 2016-17, 32.6 percent of total capital budget of MCC was invested in WASH sector, out of which 95 percent of the expenditure was met through various grants provided by the State and Central Governments. The key elements of WASH expenditure include those that incurred on: primary water sources, purchase of chemicals, purchase of vehicles, plant & machinery bought by Vani Vilas Water Works, and 13th and 14th State Finance Committee (SFC) grants utilized for roadside drains, improvement of primary water sources and public toilets. The other endowments include Chief Minister's Special grant of INR 100 crores, MP, MLA funds, etc. Similarly, the revenue income generated by WASH sector infrastructure in the city is summarized in Table 16.

MCC generates around 17.1 percent of Total Recurring Revenue through its city WASH infrastructure. The details of revenue expenditure generated by WASH sector infrastructure in the city is summarized below in Table 17.

Table 17: Share of WASH Under Revenue Expenditure in Mysuru (in lakhs)

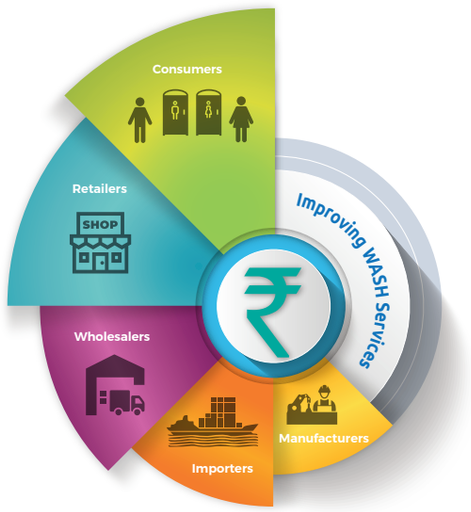
S N	Particulars	Actuals for the year 2016-17	Revised Budget Estimate for the year 2017-18	Budget Estimate for the year 2018-19
1	Total Revenue Payments in WASH sector	3,974.53	6,417.00	6,026.00
2	Total Revenue Payments[7]	26,655.99	35,900.53	40,414.68
3	% share of WASH sector	14.9%	17.9%	14.9%

Source: Mysuru City Corporation

7. Wash sector market economy of IHUWASH cities

Under the IHUWASH project, an attempt has been made to analyze the market size of WASH products. Since sanitary hardware and fast moving consumer goods (FMCG) such as toiletries are consumed mostly in the domestic sector, the current assessment is limited to them being evaluated from formal and informal markets as well as services offered in the sector. The subsequent sections provide key features of the study results based on these aspects.

Figure. 8 WASH Products Supply Chain



7.1 WASH Products Market

WASH products include sanitary hardware products and FMCG WASH products. An analysis

[7] Source – MCC Budget 2018-19

of the WASH supply chain from manufacturers to consumers is presented in Figure 8.

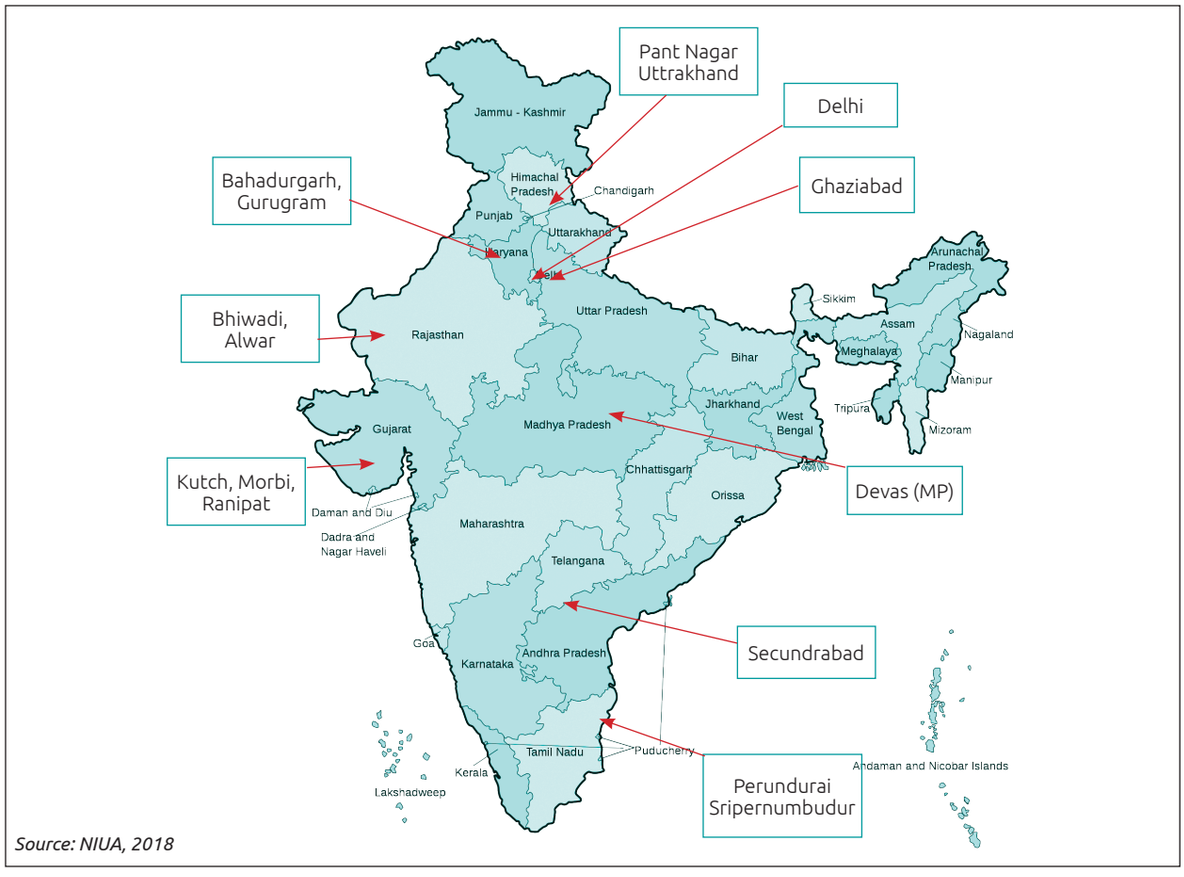
7.1.1 Sanitary Hardware

Sanitaryware is made using three main components viz. clay (ball clay and china clay), quartz and feldspar. In Sanitary hardware, ceramic sanitary-ware(s) is cost effective and dependable for the long run. Ceramic sanitary-ware is cheap, easy to clean and available in various colors. It can withstand more than 400 kgs of load, can be easily cleaned because of its glossy surface properties and provides excellent resistance from chemical attacks. Due to its low cost, lucrative value and as a preferred material choice by people of all strata, the use of sanitary-ware for sanitation purposes has not yet been replaced by other materials like steel, fiber, etc., ensuring the future prospects of ceramic sanitary-ware remaining bright.

India is also one of the key manufacturers of quality sanitary-ware products (Figure 9), which are exported globally. The Indian sanitary-ware market accounts for 8 percent of the global production and ranks second in terms of volume in the Asia-Pacific region. Average annual growth rate of the sanitary ware industry in India is 10 – 12 percent[8]. With the growing awareness of hygiene and aspirations of a higher living standard of life, consumers adapt to and opt for innovative sanitary-ware products. There is also a significant growth potential in the low-cost or entry-level segment due to economies of scale.

There is tremendous potential for expansion with rising incomes and demand for *pucca* houses. The sanitary ware and bathroom fittings industry in India together was estimated to be valued around INR 60 billion in 2013. The sanitary-ware segment was estimated to have been worth approximately

Figure 9: Major Sanitary Hardware Manufacturing Units in India



Source: NIUA, 2018

[8] Home Improvement, PwC Report, 2013

BOX-2 Trends in the Sanitary Ware and Bathroom Fittings Market

- Complete Bathroom Solutions: Due to the rising popularity of concept washrooms and coordinated sanitary-ware fittings and accessories, some manufacturers are offering a one-stop shop solution for all sanitary-ware and fittings requirements.
- Water Conservation Technology: With increasing environmental awareness, customers are moving towards eco-friendly sanitary-ware and bathroom fittings that help in the conservation of water. These eco-friendly products offer a 20% savings in water as compared with other products. Solutions such as high efficiency flushing systems, infrared controls, and sensor taps and showers are gaining popularity.
- Increasing Presence of Foreign Players: Initially, domestic players dominated the market in this segment. However, foreign players are gaining popularity as an increasing number of customers wish to purchase imported products. There have been some tie ups between foreign players and domestic players in this segment.
- Rise in Premium Segment Products: Indian customers are gradually purchasing more premium and high technology products for their bathrooms due to increase in spending power. The premium segment is estimated to comprise about 10 to 12% of the total market.

Source: - PWC Report, 2013

INR 20 billion, while the bathroom fittings segment was estimated at approximately INR 40 billion in 2012[9]. The organized segment in the sanitary-ware market in India makes up almost 45% of the market share, and is growing faster than the industry average. While the organized sector focuses mainly on middle class and affluent segments in urban areas, the unorganized sector has by and large targeted the mass end of the urban market and the rural areas. With relatively strengthening demand growth in India over the last five years, various Multinational Companies (MNCs) have also entered the market. Box-2 gives a snap-shot of the trends in the sanitary ware and bathroom fittings market.

Compared with other countries, replacement demand is low in India, and accounts for only 7%[10] of the market. Other factors such as increasing disposable incomes, higher standards of living, and increasing expenditure on beautifying homes and using premium products provide a further impetus to the growth of this segment.

With improved living standards, these items are essential and are an integral part of consumer sectors like Housing, Educational & Research Institutes, Hospitals, Industries, Hotels & Restaurants, Cinemas, Theatres and other public places. As these items are not repairable or re-usable after every installation, their demand also increases with renovation and modernization of existing systems by the sectors mentioned above. The map in Figure 9 presents the location of major sanitary hardware manufacturing units in the country. The three IHUWASH project cities also depend upon these centers.

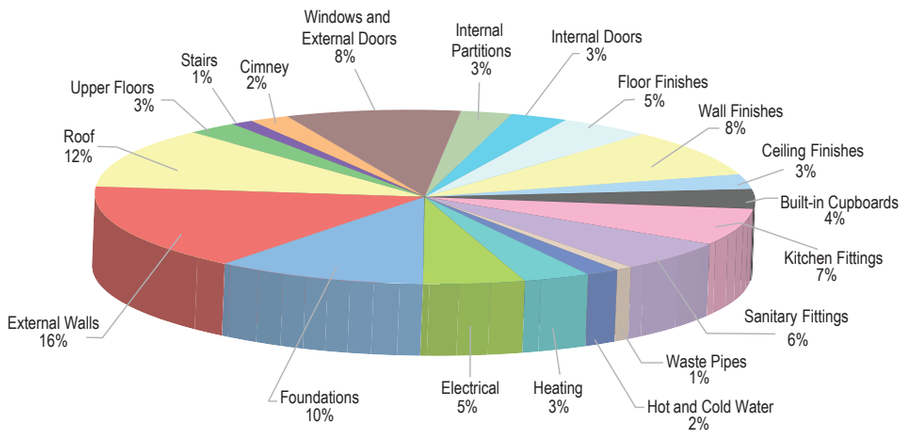
Mysuru City

The study focusses on the WASH products (sanitary-ware and FMCG) and services (plumbers and masons) and its assessment revolving around households. An estimation of this market size for Mysuru city for the three categories: Construction, Maintenance & Repairs, and Cleaning gives valuable insights. The construction cost break-up is shown in Figure 10[11]. This has been estimated based on the following premises:

- The gross estimate for the expenses for sanitary

[9] Home Improvement, PwC Report, 2013
[10] ibid
[11] WASH Economy study Mysuru

Figure 10: Construction Cost Break-up in Mysuru



works is about 7.5% to 10%.

- The cost per sq. ft. of construction is assessed at Rs. 150 to Rs. 175
- Average size of household is assessed at 700 sq. ft.

The overall estimated expenditure per year in the sanitary market for construction is: INR 4.18 crore. The average cost[12] for repairs and maintenance of toilets in Mysuru is estimated at Rs. 3,000 per annum. Considering the total number of toilets in Mysuru at 2,10,494 (one toilet per household, averaging out), the cost of repairs and maintenance is Rs. 63.15 cr. Similarly, the average cost for cleaning of toilets is estimated at Rs. 300 per month per toilet, taking it to Rs. 3,600 per annum. This amounts to INR 75.78 crore for Mysuru. The total estimated contribution of the household toilets in Mysuru per year is provided in Table 18. This total cost includes both the products and the services of the WASH sector.

Table 18: Overall Household Toilet Contribution to WASH Market in Mysuru

Sl. No.	Particulars	Amount in INR crore (per year)
1	Construction	4.18
2	Maintenance and Repairs	63.15
3	Cleaning	75.78
	Total	**143.11**

Faridabad City

The study revealed that there are about 25 wholesalers in the city, out of which 2 are large establishments and the remaining are smaller players. There are 250 retailers, mostly medium and small size ones. In the service sector around 250 plumbers/masons offer services in the city.

Most of these wholesalers also stock and wholesale Paints, Tiles and Marble. The popular sanitary ware brands sold here include: Somany, Jaquar, Oyster, Toto, Viega, Artize, Parryware, Cera, Midas, Corona, Kerovit, Orient, Aashirwad (Pipes). About 90% of these wholesalers import their products from Gujarat, the rest from various places including: Delhi, Bahadurgarh, and Secunderabad. Around 70% of the product is being sold directly to customers. Some branded companies are providing training to plumbers. According to them, sanitaryware business alone cannot sustain them that is why they also deal in tiles, marbles, paints and other construction material. New entrants too have increased their challenges making business tougher and has resulted in reduced overall sales in the sanitary-ware segment. About 90% of the time they find they are able to meet client requirements (in terms of quality, new design, new product). So, rarely does a consumer need to go to Delhi for their sanitary-ware requirement. The top-end wholesalers have business volumes of approximately INR1.5 to 2 lakh per day.

[12] Toilet Board Coalition Report, 2017

Around 250 sanitary-ware retailers do business in Faridabad city, out of which only 40 agreed to participate in the survey. There is not one particular area which focuses as a sanitary-ware market in Faridabad, the retailers are scattered and located in various sectors and parts the city. Almost all the retailers visited also deal in tiles, marbles, paints and other construction material. Some are sourcing products from local wholesalers in Delhi and from Gujarat. Most common brands they deal with are: Jaquar, Somany, Hindware, Orange, Cera, Orient, Parryware, Ashirwad (pipes), Sintex, Triple Layer (overhead tanks). People go out of Faridabad to buy sanitary-ware only if an architect insists and they are making something very luxurious. The average income of these small retailers from sanitary-ware is approx. INR 1.5 to 2 lakhs per month and they consider sanitary-ware sales to make up about 15 to 20% of their over-all business.

The key insights from the household survey reveals that almost all houses have proper toilets at home and the average annual spending on sanitary-ware to be INR 10,000 - 20,000 (for income groups INR 10 lakhs to 20 lakhs) and for lower income groups to be up to INR 5,000. The most popular sanitary-ware brands used by them include Cera (cisterns, toilet seats), Ashirwad (PVC pipes), Ganga and Sintex (overhead tanks). Most of them were found to prefer local sanitary-ware shops to buy products and according to them they were able to find the kind of products they wanted with-in the city. Most popularly used soap/hand sanitizer brands were found to be Patanjali and Dettol.

Based on the survey findings, and using the assumptions regarding sales and business, the yearly wholesale business for sanitary-ware in the city comes out to be approx. INR 19.08 crore. The annual income estimates of retailers suggest a business potential of INR 60 crore.

As per the survey findings, Faridabad has around 250 plumbers/masons in the city and their average income per person annually is INR 3.36 lakh. Total yearly income of 250 plumbers can be thus estimated at INR 8.40 crore.

Table 19: Estimation of WASH Economy in Faridabad City

Category	Numbers in Faridabad City	Avg Monthly Sales of Sanitary Products/ Services (in INR lakhs)	Total sales (in INR lakhs)
Wholesalers	25	6.36	1,908
Retailers	250	2.00	6,000
Plumbers/ Masons	250	0.28	840
Total Sales			**8,748**

Source: WASH Market Assessment, Faridabad, 2018

Based on our findings and table shown above the total market size of the sanitary-ware industry in Faridabad comes out to be INR 87 crore 48 lakhs.

Udaipur

The supply chain of both sanitaryware and FMCG products is well developed and has significant input in the overall economy of Udaipur. Based on

Table 20: Annual Turnover Pattern of Retailer/Wholesaler - Sanitaryware Products

Sanitaryware Products	Average Annual Sales of Retailers/ Wholesaler (in lakhs)		Average Annual Turnover	
	Small/Medium Retailer	Large Retailer-Wholesaler	Small-Medium Retailer	Large Retailer/ Dealer
PVC Water Tanks (OHTs)	2-5	10-15	10-40 lakhs	1-3 crore
PVC Pipes	0.6-3	10-12		
Adhesives	0.4-1	3-7		
Toilet Pan- w/c	1-3.5	5-10		
Water Tap- Steel/PVC	0.3- 1.2	2-6		
Washbasin	0.5-1.5	2.5- 10		

Source: WASH Market Assessment, Udaipur, 2018

interactions with retailers and wholesalers about the annual sales of items and their turnover, the following indicative figures were obtained:

The figures of sales given in Table 20 is limited to the given sanitary-ware products only. However, the annual turnover figures represent all the items sold by the outlet/trader (including the products mentioned in the Table). There are about 1000-1200 retailers and about 100-150 distributors/ dealers of Sanitaryware in Udaipur. A rough estimate based on sales estimates of dealers shows that the sanitaryware market (selected above products) in Udaipur is INR 80-85 crore[13].

The city also serves as a central hub for nearby

BOX-3 Manufacturing of Sanitary-ware: Udaipur Case Study

If we look at dominance of manufacturers in Udaipur, majority of available sanitary-ware products available in Udaipur are manufactured outside Rajasthan by leading companies like Sintex, CERA, Parryware, Hindware, Duravit, Reno, Ashirwad. There are couple of native manufacturers like Miraj and Wartel, which are slowly gaining acceptance in the local market. Miraj Group of Industries, with over 400 employees is the largest local manufacturer of PVC-HDPE pipes in Udaipur, it also exports products to Middle-Eastern countries. Another important local manufacturer and exporter of PVC/ CPVC pipes is Wartel, which is an ISO 9002 certified company based in Udaipur. Table. 21 lists major sanitary-ware manufacturers and their products as explored in the current study.

Table 21: Products and Location of WASH Sanitary-ware Companies in Udaipur

Sl. No.	Manufacturers/ Brands	Manufacturing Unit location	Products
1	Ashirwad	Alwar	PVC, uPVC, CPVC & HDPE pipes
2	ASTRAL	Kalol, Gujarat	PVC, uPVC, CPVC, HDPE pipes
3	CAPSTONA*	Udaipur	Stone washbasin
4	CERA	Kadi, Gujarat	Ceramic Washbasin, water closet, steel water taps, faucet, cistern
5	CORSA	Noida, Delhi	Faucets, Showers, Sinks,
6	Duravit	Tarapur, Gujarat	Ceramic Wash basin, faucet, bath tubs, water closet, cistern
7	Dutron	Vatva, Kheda, Bharuch- Gujarat	PVC water storage tanks; uPVC, CPVC, HDPE pipes, Hose pipes, uPVC fixtures
8	Finolex	Pune	uPVC pipes and fittings
9	Hindware	Bahadurgarh, Haryana	Ceramic Washbasin, water closet, steel water taps, faucet, cistern
10	Jaguar	Delhi, Haryana, Bhiwadi, Rajasthan	Ceramic Washbasin, water closet, steel water taps, faucet, cistern
11	Miraj*	Udaipur	PVC & HDPE pipes
12	Precision	Daman, Gujarat	PVC pipes
13	Reno	Kadi, Gujarat	PVC water tanks
14	Shrinath*	Udaipur	PVC & HDPE pipes
15	Sintex	Kadi, Gujarat	PVC water tanks
16	Somany	Morbi, Gujarat	Ceramic Washbasin, water closet, steel water taps, faucet, cistern
17	Wartel*	Udaipur	PVC & CPVC pipe

**Native Manufacturers*

Source: WASH Market Assessment Udaipur, 2018

[13] Estimate based on interaction with retailers and dealers combined with secondary research from yellow pages, just dial and IndiaMart

villages and towns to purchase sanitary hardware. There is also informal market in the city which usually sells faulty products along roadsides at cheaper rates. Box-3 has more details of the sanitary-ware manufacturing in Udaipur.

7.1.2 FMCG Products

The cleanliness and hygiene related fast moving consumer goods (FMCG) is now a huge market as the demand for these products is regular and increasing with improved standards of living. To assess the sale of personal hygiene products, interviews were conducted with retailers of FMCG products including medical shops. The key reasons of expected increase in personal hygiene market includes:

- Increasing disposable income of consumers
- Availability of multiple varieties of different products in the market
- Increasing demand from the younger generation

Several FMCG majors have entered the homecare market with offerings across multiple product categories. Multinational players have a well-established presence and several regional players are also establishing a nationwide presence. Market share of personal care FMCG products in urban areas is around 20 percent of total FMCG sector and that of household care products is 10 percent. The homecare product value for the year 2013-14 is pegged at INR 218 billion in India. All India market for personal care and house care FMCG products is pegged at INR 1,200 crore for Detergents, INR 2,700 crore for Shampoo and INR 3,500 crore for Soap. These products have penetrated over 90-95 percent of urban households, while its penetration in rural markets is around 60-78 percent[14].

Predominately, FMCG companies like Johnson & Johnson Services, Godrej, ITC Limited, Procter & Gamble and Unilever have a considerable market share in the personal hygiene sphere. However, in Udaipur, locally made toilet cleaning products

Table. 22 Local and Other FMCG Companies in Udaipur, Rajasthan

Sl. No.	Manufacturers	Brands	Products
Native - Udaipur based			
1	Ankey Fankey & Co.	Oxypic, Chamak	Toilet/bathroom cleaner
2	Green Chem	AURA	Toilet Cleaner, Liquid Hand-wash
3	Crozier Hygiene & Co.	Crozier	Hand wash, toilet cleaner, room freshener
4	Ajmer Chemical Soap works		Soap
5	Jatan Sansthan	Uger Pads	Washable sanitary Napkins
6	Neels Natural Soaps	Neels	Soap
External - Manufactured in India, outside Udaipur			
1	Reckitt Benckiser	Harpic, Dettol	Toilet Cleaner
2	Patanjali	Patanjali	Toilet Cleaner, Phenyl, Soaps, Hand wash
3	Godrej	Cinthol	Soap
4	Dabur	Odonil	Bathroom freshener
5	Energizer	Stayfree	Sanitary Pads
6	Procter and Gamble	Whisper	Sanitary Pads
7	Unilever	Lifebuoy, Lux, Pears, Liril	Soap, Handwash

Source: WASH Market Assessment Udaipur, 2018

[14] IBEF Report on FMCG, 2018

also contribute to business. Udaipur has about 10 to15 small and medium sized enterprises which manufacture many home care and personal care products as shown in Table. 22. The domestic consumption pattern is provided in Table. 23.

The study found that there are many small-scale industries manufacturing sanitary napkins in the city such as *Uger Pad*, a washable sanitary pad produced by the institution, *Jatan Santhan*. Active participation of women in wholesale markets in the roles of marketing and administration is not adequate and has the potential to be scaled up. The study also indicates that people's trust in brands drives the sales of several FMCG products, despite intense competition in the market. The average expenditure ratio on WASH FMCG products to household income varies from less than 1-2 percent in middle to high income group to 3-5 percent in low income group. This is below the national average of 8 percent as reflected in the PwC research (2013)[15], which can be attributed to cost conscious markets in Udaipur as well as relatively low purchasing power of consumers in Class II cities like Udaipur, as compared to Class 1 and Metro cities.

Further, survey results also show that natural product markets are gaining importance owing to increasing environmental awareness. While products like handmade bar soaps such as *Neem* and *Tulsi* have been gaining popularity in households over the past few years, in the tourist city of Udaipur, ecofriendly products like tap and shower water diffusers, half flush cisterns, etc., which can save 20-50 percent water are finding growing acceptance in hotel businesses.

These FMCG traders, be it retailer or wholesaler, generally keep other products than just WASH related products and hence, if we look at the overall turnover of these traders, its significantly higher than the sum of just WASH products sales. WASH products accounts for just 5-10% of overall FMCG sales. Table 24 gives the figures of average annual turnover for year 2017-18 of retailers, wholesalers and manufacturers of FMCG products in Udaipur.

Table. 23 Consumption Patterns of FMCG Products in Udaipur, Rajasthan

Product Type	Consumer-wise Preferred Brands	Cost Bracket	Average Annual Expenditure per Family (INR)		
	Low Income	Medium-High		Low Income	Medium-High
Liquid Hand wash	Dettol, Lifebuoy	Dettol	50-100 for 200-750 ml	150-500	400-3,000
Toilet cleaner & floor cleaner	Harpic, local acid, local phenyl	Harpic, local acid, local phenyl	70-80 for 500 ml (branded) Local, phenyl-acid (20-60) for 1 litre	150-600	120-1,000
Soaps	Local, Godrej, Patanjali, Dettol, Cinthol	Godrej, Patanjali, Dettol, Cinthol, International brands	Soap 10-70/piece	240-1000	240-1,950
Sanitary napkins	Local, stay free, whisper (many use home based cloth pads)	Stay free, Whisper, Sophy	34-48/ pack	350-400	400
Bath room Freshener	Odonil	Odonil	30/piece	90-150	120-240

Source: WASH Market Assessment Udaipur, 2018

[15] The Indian FMCG sector, PwC, 2013

Table 24 Annual Turnover Pattern of Retailer/Wholesaler – WASH FMCG Products (in lakhs)

FMCG Products	Average Sales Range of Retailers/Wholesalers - Annual		Average Annual Turnover (WASH FMCG products only)	
	Small-Medium Retailer	Large Retailer/ Wholesaler	Small-Medium Retailer	Large Retailer/ Wholesaler
Hand wash	0.1- 0.12	2-4	1-1.5	20-40
Soaps	0.2- 0.25	5-9		
Bathroom Freshener	0.06-0.1	4-8		
Toilet Cleaner & Phenyl	0.5- 0.7	5-10		
Sanitary Napkins	0.15-0.25	4.5-8		

Source: WASH Market Assessment Udaipur, 2018

Table 25: Overall Contribution of WASH Product Supply Chain in Udaipur

Sl. No.	Sector	Contribution in INR crore	
		Per month	Per annum
1	Manufacturers – Formal	69.00	828.00
2	Manufacturers – Informal	0.25	3.00
3	Wholesalers	120.00	1,440.00
4	Retailers	70.00	840.00
	Total	**259.25**	**3,111.00**

Source: WASH Market Assessment Udaipur, 2018

In Udaipur, there are about 3000 retailers of WASH products and more than 150 distributors/ wholesalers of various WASH FMCG products. A rough estimate based on sales figures reported by of retailers shows that WASH FMCG Market (selected products) in Udaipur is INR 35-45 crore[16].

The overall WASH product supply chain reveals interesting insights into the WASH economy contribution for Mysuru city. Table 25 provides a snapshot of the overall WASH product supply chain contribution to the WASH sector, which is estimated as INR 3,111 crore.

7.2 Observations on Online Markets

With the huge penetration of internet and smartphones in India, online trading and service delivery is on the rise. According to a report by Google India and the Boston Consulting Group (BCG) over 40 percent of the purchases in the FMCG in India will be conducted online, this digital drive is set to take the overall segment up to a value of $45 billion by 2020 (nearly Rs. 3 lakh crore)[17]. The FMCG e-commerce market could expand to as much as $5-6 billion in size by 2020 from the current size of less than $1 billion. Over 10 percent of the total FMCG growth over the next 3–4 years would be contributed by online channels. Amazon, BigBasket and Grofers are leading players in the online FMCG and grocery space[18]. The estimated consumption pattern by 2020 is summarized in Figure 11.

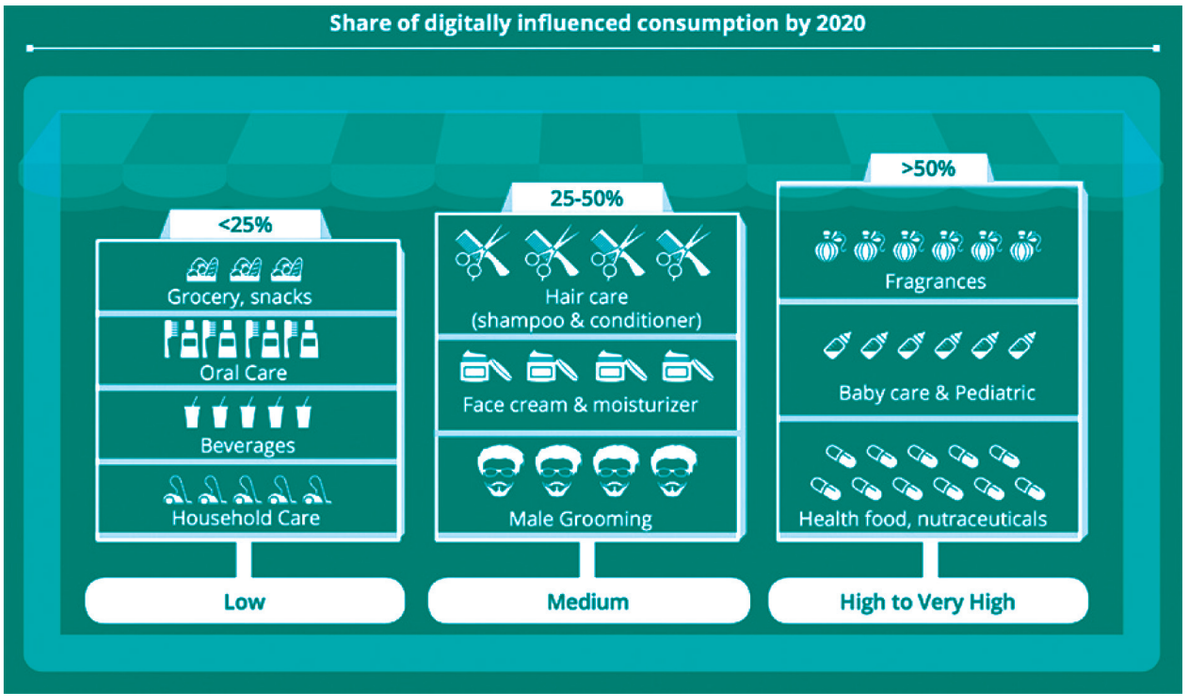
The study results show; however, that that online market for trading and service delivery for sanitary-ware products is still in a nascent stage as manufacturers still prefer marketing through conventional channels of dealers and distributors. The customer preference in Udaipur is also inclined towards purchasing sanitary-ware products from brick and mortar outlets after seeing and evaluating them physically. Nevertheless, traders do register their outlets on web directories such as Yellow Pages, Just Dial and India Mart but the service providers such as masons have initiated online purchase, mainly through big e-retailers like Amazon and Flipkart.

7.3 WASH Services

The WASH sector supports both formal and informal services. The study results show that the key players in formal sector of WASH economy are the manufacturers of WASH products and their

[16] Based on data gathered from retailers and distributers
[17] https://www.consultancy.in/news/208/40-of-fmcg-purchases-in-india-to-go-online-as-segment-approaches-45-billion
[18] http://info.shine.com/industry/fmcg/6.html

Figure. 11 Share of Digitally Influenced Consumption by 2020



Source: www.consultancy.in

traders; whereas at the city level, masons and plumbers make up the informal service providers. The sector has negligible participation of women as workers. The new trend of App-based services has not yet caught up with WASH sector in any of the cities surveyed.

From the household survey in Udaipur, it was evident that water tank cleaning is mainly done at the household level. Also, septic tank cleaning is a pressing issue in Udaipur. A few private operators and Municipalities do offer services for cleaning and emptying septic tanks; however, the coverage is limited as indicated by the particular Municipality office. Considering the fact that septage management is a major issue in the region and septic tank emptying is a key service in demand, employment generation through this service can be widely explored. While manufacturing and trading is predominantly a formal sector, the Service providers are mainly from the informal sector. There is no functional association of plumbers/masons and App-based service aggregators have negligible presence

Table 26: Overall Employability Under WASH Product and Service Sector in Mysuru

Sl. No.	Sector	No. of units	No. of employees	Average monthly salary in Rs.	Yearly Salary in Rs. Cr
1	Manufacturers	20	10	12,000	2.88
2	Wholesalers	186	4	12,000	10.71
3	Retailers	400	2	12,000	11.52
4	Plumbers		800		13.00
5	Masons		1,000		18.00
				Total	**56.11**

Source: WASH Market Assessment Mysuru, 2018

Table 27: Total Number of People Directly Working in Sanitary Ware Business in Faridabad

Stakeholders	Total Numbers in Faridabad City	Avg. No. of employees per stakeholder	Total estimated employment numbers
Wholesaler	25	4	100
Retailer	250	3	750
Plumbers/Mason	250		250
Helper to Plumbers/masons	300		300
Total			**1,400**

Source: WASH Market Assessment Faridabad, 2018

Table 28: Contribution to Economy through Sanitaryware, FMCG and WASH Services

IHUWASH Project City		Total Estimated Income in INR crore per annum
Faridabad		
Wholesalers (Sanitary-ware +FMCG)		19.08
Retailers (Sanitary-ware +FMCG)		60.00
WASH Services (Plumbers and Masons)		8.40
	Total	**87.48**
Mysuru		
Market Assessment of Hardware	Construction (Sanitary-ware)	4.18
	Maintenance & Repair	63.15
	Cleaning	75.78
	Sub-total	***143.11***
Supply-chain Product Market Assessment	Manufacturers (Formal)	828.00
	Manufacturers (Informal)	3.00
	Wholesalers	1,440.00
	Retailers	840.00
	Sub-total	***3,111.00***
WASH Service Assessment	Plumbers	13.00
	Masons	18.00
	Others (Manufacturers + Wholesalers+ Retailers)	25.11
	Sub-total	***56.11***
Udaipur		
Sanitary-ware Products		80 to 85
FMCG		35-45
WASH Services		4-6
Total		**136**

Source: WASH Market Assessment Faridabad, Mysuru and Udaipur, 2018

in Udaipur; therefore, this field is a wide-open opportunity area. As per discussion with service providers, contractors and plumbers in Udaipur, a rough estimate of service sector economy in WASH allied activities can be considered to be about INR 4-6 crore. This is mainly from the informal sector's participation including septage management, which is estimated at INR 1-1.5 crore annually.

The overall employability in the WASH market in city of Mysuru and Faridabad is provided in Table. 23 and Table. 24, respectively. As per the survey findings[19], Faridabad has around 250 plumbers/ masons in the city and average income per person yearly is INR 3.36 lakh. Total yearly income of 250 plumbers is pegged at INR 8.40 crore.

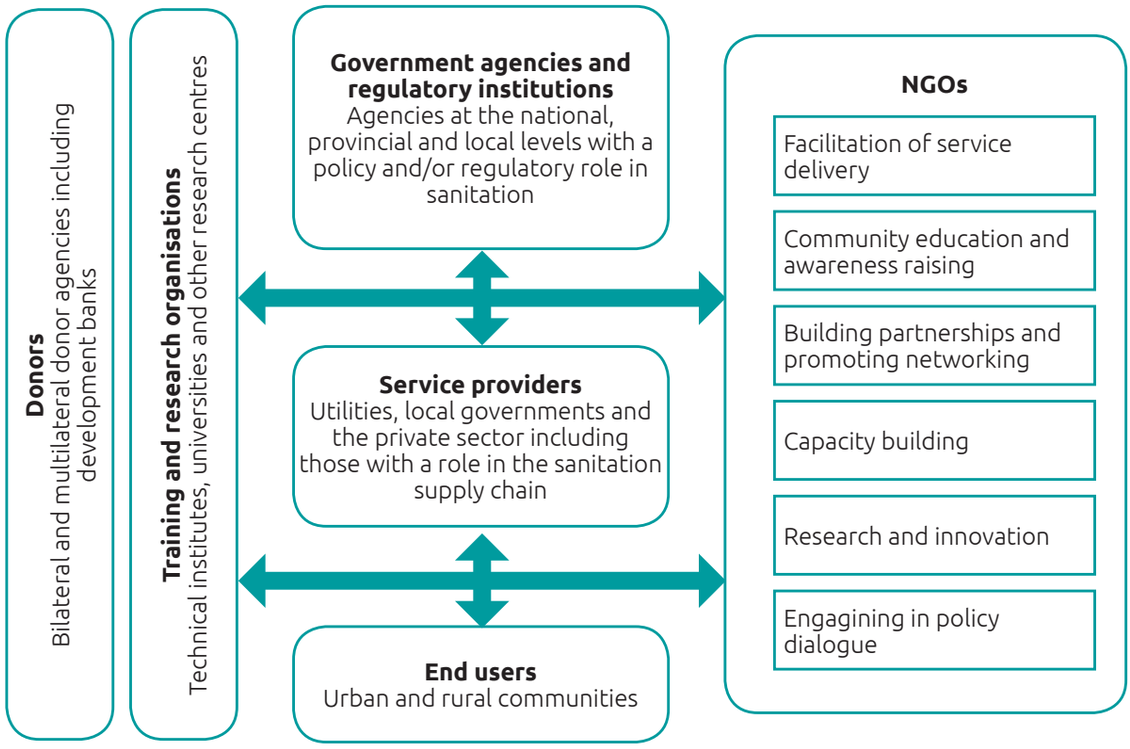
7.4 Role of NGOs for Capacity Building in WASH Sector

NGOs in the sanitation sector are important resource for adopting innovative approaches and providing services to support sustainability and effective use. They are better equipped to ensure community participation and capacity building for providing sustainable benefits to the people. The roles are further defined in Figure12.

However, during the interaction with NGOs and service providers in Udaipur, it has been revealed that technical training/capacity building of workers is minimal. Plumbers and masons learn about new products and techniques on job or through site contractors/engineers. The study also shows that only one technical training program conducted by ICICI bank for masons/plumbers was mentioned by plumbers. Also, the fact is that women's role and participation in WASH service is almost nil.

In Mysuru, the Government has taken initiative for training of workers and its details are summarized in Box 4.

Figure 12. Role of NGOs in WASH Sector



[19] WASH Economy Report, Faridabad, 2018

Box – 4 Mysuru Nirmiti Kendra Case Study

Mysuru Nirmithi Kendra is a successful Building Centre functioning under the national network of Building Centres Scheme promoted by Government of India through HUDCO and is being implemented by Government of Karnataka. Established in March 1989, the main activities undertaken by the institute include: training; production of cost-effective building materials and construction of buildings with cost effective building technology; advising individuals on housing construction (consultancy) and training engineers, builders, masons and laborers. The key WASH related capacity building measures are summarized below:

- Training of unskilled or semi-skilled artisans in various building and production activities
- Training urban youths under NULM (National Urban Livelihood Mission) sponsored by Government of India
- Regular training programs under Skill Development Initiative

8. Way Forward

This study is a contribution to a direction for larger research and offers a unique opportunity created by the agreement of Sustainable Development Goal (SDG) 6 on Water and Sanitation (and Hygiene) and SDG 17 (Global Partnership). The synergistic relation among all SDGs, more importantly, SDG 9 (Industry, Infrastructure and Innovation) and SDG 11 (Sustainable Cities and Communities) can be leveraged in order to achieve the targets of SDG 6.

The recommendations are predicated on a set of data points, which can be debated and tested. However, there is a clear case for scaling up engagement of the private sector in the WASH sector, in support of universal access. But making that case convincing, and refining it, requires much stronger data – for example to quantify and qualify the impact on financial bottom-lines from investing in WASH in the workplace and supply chain. This can further be extended to the social and environmental bottom-lines to get a holistic perspective of private sector's role and contribution to the WASH sector.

Water, Sanitation and Hygiene sector market assessment in the three project cities highlights the issues faced by various stakeholders and a way forward for WASH economy assessment at the country level. Assessment gives significant takeaways and insights on the potential of WASH product development, market enhancement and WASH related services. The study revealed that domestic WASH businesses have considerable market knowledge (local) and penetration too. However, there is a lack of capacity for innovative WASH product development, marketing strategies, and access to finance for development of products. Importantly, the services rendered for the WASH sector needs attention to scale up the services. Thus, scaling domestic and small-scale private sector development in WASH sector must be the key focus for Government (Central and State) and WASH agencies. It is also unlikely that the domestic and small-scale private sector alone can provide all the solutions. Established larger companies must offer both resources and know-how to help address critical bottlenecks.

The bottlenecks include contextualized innovative product development, fitting of accessories, which are new in the market, and the services of public sanitation facilities. The sales and growth of sanitary-ware products and services have grown with the realty sector's development, but since it is usually a one-time investment by the households, the traders have added other product portfolios in marbles, tiles, paints and other construction materials for improved business viability. Some key insights from assessment of wholesalers and retailers in the study cities are:

- There is increasing demand for branded products from companies such as: Somany, Jaquar, Oyster, Toto, Viega, Artize, Parryware, Cera, Midas, Corona, Kerovit, Orient, and Aashirwad. This is in-line with higher all India annual growth of the premium products segment of the sanitary-ware market
- 90% of wholesalers are importing sanitary-ware products from Gujarat, which is acting as the biggest producing market for sanitary ware products
- Some 30% of sales from wholesalers is to local retailers, while the remaining 70% is to direct bulk and small consumers
- Women involvement in this sector is marginal, with very few employed as accountants and receptionists
- There are very few large wholesalers in the city who deal only in sanitary-ware products, their monthly sales averaging INR 45 lakhs. Other wholesalers who sell a mix of products with average 20% sales in sanitary-ware products have an average total sale of INR 10-15 lakhs per month. A retailer does an average INR 8-10 lakhs of monthly total sales, of which 15-20% is from sanitary ware products

In order to strengthen the WASH economy of the country, a set of recommendations is mentioned here. They are presented in three broad categories: Government, Private Sector and Consumers

8.1 For Government/Policy Makers

- The need for certification across sanitation verticals such as construction and plumbing has emerged as a key focus area in order to create demand for qualified professionals. To facilitate this, National Skill Development Corporation (NSDC) can play a big role in ensuring a certification process for masons and plumbers. Apart from that, technical institutions can take initiative by developing professional courses in the sanitation space. The potential of app-based service providers can be explored to increase the business for professionals and thereby increasing their source of income.
- A sustained effort towards building awareness about the significance of certification and continually creating a demand for such degrees will help to fortify the skilling process. Currently, sanitation jobs are undertaken based either on caste or by communities that are socially or financially marginalized. Initiatives should be taken to eradicate caste-based practices and encourage mainstream communities to pursue this as a career option.
- Government could facilitate (with private and public sector engagement) and incentivize scaling domestic and small-scale private sector development in WASH sector.
- New hubs of manufacture of WASH products such as sanitary hardware as well as FMCG, need to be developed. Presently, it is restricted to very few states such as Gujarat.
- App-based WASH services will see sharp rise in near future and hence facilitating service providers with a policy to mark their presence online will not only expand the services but also help them come into the formal sector from the informal sector.
- The ULBs should initiate reforms to diversify revenue sources, improve credit-worthiness, facilitate operational autonomy and improve technical capabilities of each of the WASH divisions, for effective utilization of financial and human resources.
- The ULBs as well as the State Governments could focus on appropriate technologies and service packages for septage management and fecal sludge management. Promotion of decentralized waste treatment options like DEWATS (Decentralized Water Treatment System), reed bed systems, improved septic tanks, bio toilets, waterless urinals and bio-digestors for toilets should be promoted. Septic tank cleaning and water tank cleaning services with focus on hygiene is major service area that can be looked into.
- Communication is key to WASH services. The respective ULBs should communicate the various steps as well as new and innovative actions being undertaken with all stakeholders.
- Some traders have shown their displeasure on Government regulations in Udaipur region which allows only cement block toilets to be used in government schemes. This restricts the market of many new products like portable toilets.

8.2 For WASH Sector Industries/ Private Sector

- Effective engagement mechanisms will need to leverage private sector contribution, and ensure representation, from multiple levels – multinationals down to small-scale enterprises. The IHUWASH project initiatives, is an example of such a partnership of all key stakeholders and would help in bridging the gap among stakeholders.
- Supply chain management in WASH products is still conventional and has tremendous potential to grow through online marketing and customer service. Innovations in selling through online supply, can help in increasing scale of the business and can also bring in transparency and accountability in transactions.
- The cities in proximity of the National Capital/Metro cities have the potential to be manufacturing hubs of sanitary wares and FMCG, which could be supported by the government and private sector.
- Many of the bigger brands of sanitation related products are supporting skills training to plumbers and masons for installation of their products. They could extend this service towards increased skilling and thereby helping

to create improved income potential and at the same time supporting higher quality services to the consumers.

- Entrepreneurs have emerged in the sanitation space with innovative business models. An enabling environment is necessary which should be supported by inclusive financing options, linkages with banks, and partnerships with Municipal Corporations along with the private sector. These purpose driven institutions not only provide livelihood, but also change the sanitation scenario in the city.
- Many of the ULBs have taken a series of steps to improve their respective WASH infrastructures. Once the infrastructure is strengthened it will pave the way to increase and improve allied services and product markets. At this stage, private sector participation will be crucial. A platform at city level to encourage innovation in WASH based services will help to improve quality of life and lessen the burden on the ULBs.
- Capacity building of human resources through Corporate Social Responsibility (CSR) activities would help in sustaining WASH related efforts on ground. CSR could facilitate financing schemes for the communities and help them in taking ownership.

8.3 For Consumers

- Education and public awareness in the WASH sector is very important and a must requirement for effective use of sanitary and FMCG products.
- Extensive training of mason/plumbers also including eco-sanitation, identification of quality materials, water saving options, etc. should be conducted in urban sanitation sectors, where the need is more towards service-based solutions, hard-core engineering and infrastructure development. An institutionalized training system needs to be created both at the State and District levels with an aim to build labor capacities along each step of the value chain, improve efficiency and help broaden their spectrum.
- Presently, the demand in the market is for contemporary designs of sanitary-wares. With the right campaigning it can be aligned towards environment friendly and technologically superior products.
- The perceived access gaps to service providers like plumbers, masons and helpers can be filled with increasing adoption of new age Apps. New innovations in WASH related sanitary ware and FMCG product segments and new mechanisms for delivery and services will see higher contribution from WASH towards local city economies.

Notes:

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Faridabad is an important industrial hub, the most populated city in Haryana and part of the National Capital Region (NCR). It is being developed under the Smart Cities Mission, Swachh Bharat Mission and the Atal Mission for Rejuvenation and Urban Transformation (AMRUT).

Mysuru is the second largest city in Karnataka and an important educational, commercial and administrative hub. Since the city is a tourist and heritage centre, it is covered under Swachh Bharat Mission and the AMRUT.

Udaipur, 'The City of Lakes' in the state of Rajasthan and is known for its picturesque surroundings and royal past. Its rich architectural heritage and beautiful lakes fascinate tourists worldwide and encourage them to visit the historic city. It is being developed under the Smart Cities Mission, Swachh Bharat Mission and AMRUT.

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