

WASTE MANAGEMENT UNDER SWACHH BHARAT MISSION WITH REFERENCE TO NATIONAL GREEN TRIBUNAL'S GUIDELINES IN SMART CITY UDAIPUR



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Introduction- Udaipur is situated in the southern part of Rajasthan. The city is known as city of lakes and is a popular tourism site due to its sound history, Rajput Palaces and scenic nature. In medieval era the city was the capital of Mewar surrounded by Aravali hills. It is also famous for its handicraft and rich minerals. Udaipur is the Sub-Divisional head quarter of six tribal populated district viz Udaipur, Dungarpur, Banswara, Pratapgarh, Rajasamand and Chittorgarh. It's the first city fluxed by tribal population to be selected as India's Smart City in first round of the mission on 28 January 2016 in top 20 cities. "100 smart city mission" was launched on 25th June 2015 aiming to develop entire eco-system of cities (institutional, physical, social and economic infrastructure) by 20231.

This paper focuses on the measures taken by district administration and Udaipur Municipal Corporation (UMC) to transform Udaipur city as Smart City to become more sustainable and inclusive, providing all kind of essential qualitative services to citizen. The paper critically evaluates the measures taken by UMC and district administration in the compliance of the guidelines of national green tribunal (NGT), regarding solid waste, plastic waste, industrial waste, water and air pollution. As district Udaipur is a tribal populated district almost 50% population of the district is tribal also the district is the divisional headquarter of scheduled area including eight district and 31 tehsils and 70.42% population is tribe, specially bhil, meena, garasia and damor². The paper tries to reintroduce the practices adopted by indigenous people to meet-out current environment challenges faced by developing cities specially the waste generation, disposal and reuse. The methodology in this paper is the collection of data through secondary sources which include research article, newspaper and books available on internet and TRI library. The paper also suggests ways to overcome the challenges in making Udaipur a citizen centric smart city as the city is smart if and only if people are smart.

Swachh Bharat Mission –Prime Minister of India launched SBM on 2nd October 2014 to achieve universal sanitation coverage, and on the 150th birth anniversary of Father of Nation Mahatma Gandhi i.e. on 2nd October 2019 all villages, GPs, District, State and UTs declared themselves "open-defecation free" (ODF) in the first phase. The mission is leading towards the second phase (ODF-Plus) emphasizing on behavioral changes on the mindset towards sanitation (sustainability) and safe

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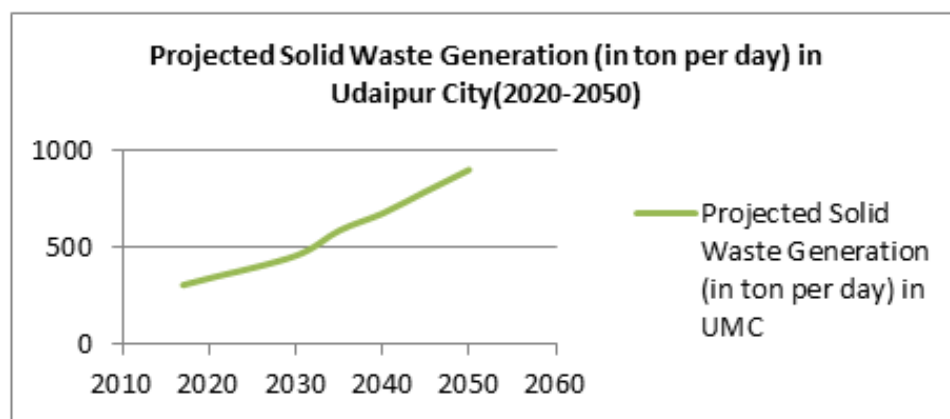
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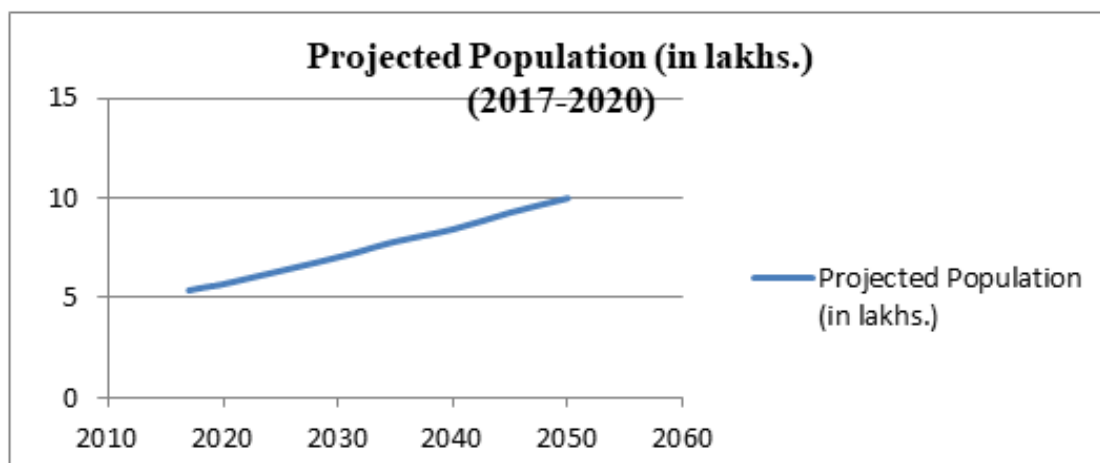
management of solid and liquid waste in cities as well as in villages³.

According to current Swachh Survekshan 2020⁴ report by Ministry Of Housing & Urban Affairs (MoH&UA), GOI Udaipur's rank first in the state (1-10 lakh population) state improved from 136 in 2019 to 54 (out of 382) scoring 3814.36 out of 6000 on various parameters in India. This survey was completely digitalized and paperless and quarterly assessed cities performance on the basis of citizen feedback, direct observation, certification on garbage and ODF and ODF plus cities and service level progress.

Concept of Smart Cities in India-According to NITI Aayog⁵ as per 2011 census in India 377 million people living in 7935 urban cities generate 1.7 lakh tones of Municipal Solid Waste (MSW) daily. Daily MSW generation ranges from 170 gram per person(pp) in small cities to 620 gram pp in large cities. According to planning commission⁶ study on MSW (2014) out of this waste 51% is organic or bio degradable, 32% is non organic and rest 17% is recyclable waste. According to world bank report⁷ 'What a waste 2.0' report world generates 2.01 bn tonnes of municipal waste every year and will increase by 3.4bn tones by 2050 if not properly addressed due to urbanization, population growth and economic development. India generates highest waste in the world 277.1 million tons (more than 10% of world waste) followed by USA, China, Brazil and Indonesia. But India is among the lowest per capita waste generator country in the world. Per capita waste generation (PCWG) in India is 0.57kg below global average 0.74kg. India's PCWG is projected to increase by 900gm by 2050. According to the report PCWG is highest in Bermuda 4.54kg followed by USA 2.24kg and Russia 1.33kg.

The graph mentioned below shows the projections of projected solid waste generation by 2050 on the basis of United Nation (UN) population projection of city population and using per capita solid waste generation per day and estimated waste generation by 2050 for Udaipur City. By 2050 the projected population of the city will be about 10 lakh and PCSW generation will be 900 ton per day. The projected data shows the gravity of solid waste generation in the city and hope will be helpful for waste management planners in capacity building of waste treatment facilities in the city area.





Source : UNDP population projection.8 and PCSW generation as per current Indian Average and world bank projection

Projected Population and Estimation of Solid Waste Generation in UDAIPUR (2017-2050)

Year	2017	2018	2019	2020	2030	2035	2040	2045	2050
Projected Population (in lakhs)	5.38	5.49	5.59	5.69	7.04	7.83	8.44	9.28	10
SWG (<u>inTPD</u>)	306.66	318.42	329.81	341.4	457.6	587.25	675.2	788.8	900

SWG in TPD for UDAIPUR calculated on the basis of projected population by UNDP and Average SWG growth estimated by World Bank for India

According to the report more than 50% food and green waste in low and middle income countries compared to only 32% in developed nations. In India 77% of waste is disposed off in open dumps, 18% is composted and just 5% is recycled. 90% waste generated by low income countries is not properly disposed and creates hazards to environment. About 1.6 billion ton of CO₂ emission (5% of global CO₂ emission) is all due to improper treatment and disposal of waste.

About 50% of the district population is tribal and in city area the tribal percentage is 10.5 which is increasing quickly as the city is surrounded by tribal populated blocks and tribal populated district, so in case of waste management the city has the potential to manage waste in the line of tribal knowledge and culture viz. minimum needs, low waste generation and reuse recycling nature of living. In tribal area especially in TSP area agriculture and livestock is the main source of livelihood. Agriculture production in the area due to many reasons is mostly for self-consumption without marketable surplus but sustainable- small size of land holding, non-mechanization of fields, lack of knowledge.

The only way a city can be considered smart is that if all of its citizens have easy access

to essential services like water, electricity, transportation, and other basic public amenities, in addition to merit goods like quality education and health care.

In terms of water, electricity, transportation resources, and basic public amenities, Udaipur local government has done an excellent job under Smart City. In the city of Udaipur, these services are readily available and of high quality. As a result, the administration has worked hard to ensure that development remains sustainable, and these facilities will be available for the benefit of the district's residents as well as tourists who visit on a regular basis, including students for educational purposes, patients in need of medical care, and those living in nearby village area looking for work as casual labor. Since many workers come from nearby villages, it's important to keep an eye out for availability of basic amenities and available resources viz. water, sanitation and transportation.

The increasing population and the resulting population flow have an impact on resource availability, and this needs to be taken into consideration. The city of Udaipur is fluxed by population as its the divisional headquarter and surrounded by the tribal district, where resources and employment opportunities are scarcer than in Udaipur, education and health care are important services. There are a total of 44 educational institutions in the district, including 10 public colleges, 33 private college, 5 medical colleges and number of medical clinics & medical hospitals 44 engineering management colleges and five universities (public and private).

Considering that Udaipur is a well-known tourist destination 11-12 lakh tourist per year (2019-20), including medical and education tourism and migrant worker as casual labor this number reaches to 15.85 Lakh almost three times the actual city headcount numbers, there is a pressing need to expand the current scope of the smart city (currently 18 wards, 3- 4 KM area to covering all 137 periphery villages 590 sq.KM area) in light of anticipated population growth, population flux, and a dearth of resources in the area.

Estimated population of Udaipur City and Flux population for Urban planning-

Estimated city population		5.5 Lakh	5.5 Lakh
Flux population(footfall)	Tourist (Domestic & Foreign)	11.85 Lakh	15.85 Lakh
	Migrants as casual labor	2 Lakh	
	For Education	50 Thousand	
	For Medical Services	1.5 Lakh	

NATIONAL GREEN TRIBUNAL GUIDELINES AND IT'S COMPLIANCE IN SMART CITY UDAIPUR –A CRITICAL EVALUTION

According to the Sustainable Development Report⁹ 2019 released by Directorate of Economics and Statistics rank of Udaipur City is 21 under Sustainable Cities and Community (SDG-11) with the score 81.91. It's good that the city is transforming and performing as front runner. Lots of smart solutions have been applied to transform the city as smart city keeping citizen centric approach to provide clean, green, sustainable, qualitative living. Here in this section, we will examine the smart solutions and the work done by UMC (Udaipur Municipal Corporation) and the Udaipur Smart City limited in waste management rules 2016 specially – (1) Solid Waste Management (2) Plastic Waste Management (3) Hazardous Industrial Waste Management (4) Bio-Medical Waste Management Rules 2016 as per the guidelines of National Green Tribunal (NGT).

District administration is working in the direction of guidelines issued by NGT, PCB and environment ministry. A detailed district environment plan¹⁰ has been prepared and sent to state for approval. The plan covers all the measures to combat pollution air, water and noise. Special emphasis is on waste management i.e. reduce, recycle and reuse for sustainable development. It's the need of the time to reduce pressure on available resources as resources are scarce and urbanization is fast. MoHUA has designed 25 key garbage free parameters to assess cities cleanliness and aesthetics rating. District Administration (DA), Udaipur Municipal Corporation (UMC) and District Pollution Control Board (DPCB) is working on it. Now we will discuss steps taken by district administration on waste management and pollution in city area. The paper explains the measures taken by DA are based on monthly progress reports of UMC and DPCB presented in Special Task Force meeting in the month of August 2020.¹¹

Compliance of waste management rules 2016 as per NGT guidelines- Municipal Solid Waste recycling, Water pollution & Sewage Treatment and Plastic Waste Management

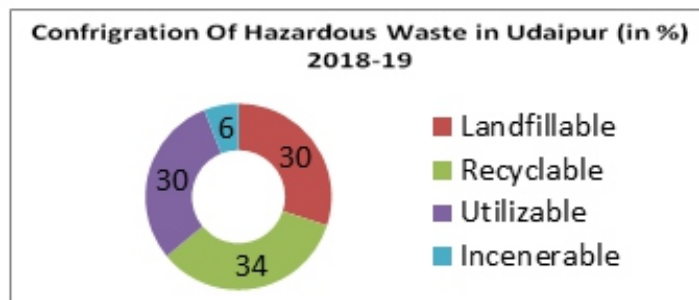
1. A special task force has been constituted in the districts to monitor the compliance of all environment related issues viz. solid waste management (SWM), plastic waste, bio-medical waste and other pollution related issues. Monthly meeting is being conducted every month.
2. 100% door to door collection and transportation of MSW through covered vehicles- (115 auto tippers, 7 dumpers and 6 composters) from all 70 wards of city area and after segregation at collection station processed at two identified dumping sites for processing.
3. The MSW is processed at dumping site Balicha and Titardi in material recovery facility(MRF) plant of capacity 60TPD and 30TPD (ton per day) at Titardi and 2TPD biomethanation plant at Purohito ki madri is operational and the civil work of 60TPD MRF and 20TPD biomethanation plant at balicha is under progress .

4. As per the guidelines its mandatory for the administration to process legacy waste. Since 2008 municipal mixed waste is being dumped at Balicha dumping site is about 3.77 lakh cubic meter (CUM). Processing of legacy waste is necessary through treating old dump by biomining / bio remediation process to stop burning of waste. UMC has started treating 2 lakh CUM legacy waste(LW). After treatment of LW 1110 ton of refuse derived fuel (RDF) is given to cement plant.
5. The process has started to develop Balicha landfill site as Sanitary landfill.
6. For garden waste, garden composting is being done in 40 gardens.
7. Construction and demolition waste (C & D) waste is being collected through tractors, 50TPD C&D waste processing plant has been installed at Balicha and the plant is under trial run.
8. Some of the major important type of waste water treatment process are – Effluent Treatment Plant (ETP), Sewage Treatment Plant (STP), Common & Combined Effluent Treatment Plant (CETP)
9. Ayad River is the lifeline and beauty of the city. To stop the dumping of liquid waste 147 drainage in the river 18km trunk line has been installed at the both side of the river. And to recycle the waste water work on three sewerage treatment plant (STP) of 60MLD is going on at Manwakhera, FCI and Pulan under O&M by HZL Udaipur on boot basis. It is sufficient to meet the treatment of present total sewage generation of the city that is 57MLD.
10. About 98 hotels and industries have installed STP as per PCB report.
11. There is no CETP in Udaipur city.
12. There is complete ban on plastic carry bags in municipal area, since jan 2020 about 5400kg of plastic carry bags seized and sent to cement factories to be used as RDF.
13. In 2019-20 total 5200 ton of plastic waste generated in district out of this 4745 ton of plastic waste was collected and 50% was recycle and reused as per UMC report.
14. To recycle plastic bottles in city are plastic bottles crushing machines have been installed at four different location (Fateh Sagar, Bus Stand, Sukhadia Circle and Saheliyon Ki Badi) in city area.
15. For the effective implementation of ban on plastic carry bags Cloth Bag Vending Machines are being installed in city area.

Industrial Hazardous Solid Waste in Udaipur and compliance of O&A NO.804/2017-

As per annual report of DPCB 2018-19, In Udaipur district 44 units were generating 25049 MT

of hazardous waste annually out of this 30% was landfill able, 34% was recycling, 30% was utilizable and rest 6% was incinerable. Udaipur Chamber of Commerce & Industry (UCCI) has identified 8 hectare of land near Gudli in Mavli block to develop common treatment, storage and disposal facility (CTSDF) for the scientific disposal of hazardous waste. The UCCI also constituted a Trust Udaipur Industrial Waste Management and Research Center in 2002 for development of disposal facility of hazardous waste in set apart land costing 18 crore. Identification of land for industrial solid waste disposal is under process.



Source :District Pollution Control Board (DPCB),Udaipur

Air pollution and Udaipur City –

According to world health organization (WHO)12 air pollution level is dangerously high and 9 out of 10 people worldwide breathe polluted air, and estimates that about 7 million people die every year due to exposure to polluted air worldwide and 30% are from south east asia. Air pollution is a global challenge caused by multiple factors like industries, transportation, dust, agriculture practices, households and waste management.

Air quality is measured through air quality index (AQI) ranging form 0 to 500 in six ranges of 50 each. Up to 100 AQI is acceptable and beyond 100 its unhealthy and hazardous. In India the the National Air Quality Index (AQI) was launched on 17 September 2014 under Swachh Bharat Abhiyan by Ministry of Environment and climate Change (MoE&CC), is composed on 8 pollutants13 PM10,PM2.5,NO2,SO2,CO,O3,NH3 & Pb. The data of AIQ is published daily on website14 today at the time of writing article on 3rd, November 2021, 2.47PM the AQI of Udaipur city was- 145, primary pollutant 102 PM10 in poor range (high upto 300 in night)and the SO2 level is 109 micro gm/m3, which is alarming.

Udaipur is located into hilly terrain is comparatively free from air pollution but increasing frequency of traffic in the city area due to a tourist destination and traffic of NH passing through are deteriorating air quality of the city (kapoor CS et. la 2009)15. Topography of any city or area is also responsible for poor air quality. Udaipur with its lakes lies on the south slope of Aravalli range in Rajasthan. The northern part of the district consists of plateaus, southern part is covered with rocks, hills and dense forest and only the eastern part having vast stretches of fertile plains, is open and providing

vent to the air. Topography of Udaipur is bowl-shaped. Concentration of pollutants can be greater in valleys than for area of higher grounds, because under certain weather condition pollutants can become trapped in low lying areas such as valleys. District administration has taken various steps to control air pollution due to various factors specially traffic.

1. PUC is mandatory for all vehicles in city area.
2. District Transport committee has deregulated license of 32700 vehicles registered till 31.3.2001 and issued notice to vehicle owners having vehicles registered till 11.3.2004 and deferred renewal of 12000 vehicles.
3. In city area there are about 4500 diesel auto Riksha (tempo) and six city buses of UMC are the only source of public transportation. To transform city as Smart city focus must be on green/ electric public transport and bicycle track to improve traffic and air quality.
4. State government has made provision of about 50 crore in last budget for traffic problem of Udaipur city. District administration constituted a committee to prepare district traffic management plan to resolve the traffic congestion. Committee finally suggested construction of three flyover, the work is under progress.
5. Smart city limited Udaipur is also working on two major green buffer roads along the traffic corridors from Sevasharm to Jadav Nursery and Saras Dairy to Balicha. Vented cause way was constructed on Ayad river.
6. Apart from this works of widening of road, plantation and construction of parking were taken up by smart city.

Air Pollution and Compliance of OA no. 681/2018 -India's rank in Environment Performance Index released by Yale center for Environmental Law & Policy has dropped from 155 in 2014 to 168 this year out of 180 countries. India notified its first Environment Impact Assessment (EIA) norms in 1994, further amended in 2006 and current EIA 2020 by MoE&CC amends the norms to make process more transparent and expedient. Still the Clause 22 which allows ex post facto clearance just by imposing penalties it's the major concern of NGT. NGT and SC verdict of 2017 clearly states that grants of an ex post facto environment clearance would be detrimental to the environment. (Deka K 2020)16. Udaipur city is listed as polluted city by CPCB due to violation of national ambient air quality standard. It's necessary to take measures to improve the air quality.

Steps taken by DPCB and district administration to improve air quality are as follows-

1. Quarterly meeting on air pollution for non attainment city is being conducted regularly.
2. 176 air polluting industries were identified and regular inspection and monitoring is being carried out.
3. Continuous Ambient air quality monitoring station (CAAQMS) has been installed at

Court Choraha to continuously monitor air quality in city area. Apart from this AQI is measured at three manual air quality monitoring stations.

4. As per SPCB 17 category of industries responsible for air pollution are being effectively monitored through self regulatory mechanism.
5. SPCB has installed common servers to facilitate data transfer of water and air pollution in 21 industries in Udaipur.
6. Control measures are taken by UMC for fugitive emission from material handling-conveying and screening operations through water sprinkling, curtain barriers and dust suppression units.
7. In municipal area all waste collection and transporting vehicles are covered.

Compliance of O.A. No.325/2015 Water Bodies Rejuvenation in Udaipur-

District administration is committed to clean all water bodies. The work was initiated to recharge water bodies and to increase ground water level under Mukhya Mantri Jal Swawalamban Yojna (MJSY). Currently the scheme is known as Rajeev Gandhi Jal Sanchya Yojana with some modification. According sample study of ground water department in district after the completion of various structure to recharge ground water level the ground water level raised by 2.1 meter. And the positive results reflected as increase in crop production by 28% specially in Rabi season due to improvement in irrigation facility because of availability of water. MJSY also improved the drinking water problem in rain fed rural area specially in summers. A study conducted by district PHED department reveals that there is 56% reduction in tankers supply in summer, saved almost 4 crore. Like rural area district administration is also committed to improve the condition of Seven Lakes 'Treasure of the City' in city area. These Seven Lakes are Pichola, Fateh Sagar, Swaroop Sagar, Goverdhan Sagar, Rang Sagar, Kumaharia Talab and Doodh Talai. All these water bodies covers total 7.027 KM² area and are important tourism spot. The water is also used for drinking purpose in city area except Goverdhan Sagar, which is for ground water recharge. Budget provisions to clean protect and rejuvenate city area water bodies are 1.44 crore.

SMART CITY UDAIPUR OF TSP AREA: LEARNING LESSONS FROM INDIGENOUS CULTURE AND KNOWLEDGE

Per capita waste generation by tribals is much less than the city population because of many reasons

1. NATURAL LIVING-Tribal lives in hilly forest area, habitats are scattered homesteads, isolated settlement, not properly connected by roads and basic infrastructure.
2. LAND IS THE LIFE AND GLORY OF TRIBALS-Agriculture and Forest Produce is the main source of livelihood of almost all tribal's living in hilly forest area, tribal's treat land

as dhertimata. Due to this close association they work hard to protect land, water bodies and flora and fauna of their surroundings. The economy of these tribes is agro forest based and considered to be subsistence economy.

3. **UNITY IS THE STRENGTH-** The isolates and scattered mode of living keeps the villagers bound together as well as in harmony with nature. Although the smallest unit of social structure of the tribal's is family based on individualism yet one can easily observe unique sense of tribal community consciousness among tribal's and tribal villages in favorable and unfavorable situations.
4. **SOCIAL SUPPORT-** Social support is the key to survive , tribal's help each other in various ceremonies and rituals. One can observe the people lend a helping hand at the time of construction of Awas, toilet ,rural roads and MANREGA site and also in any community drive like health and sanitation.
5. **CATTLE IS THE CAPITAL ASSET OF TRIBALS-** They contributes to the source of subsistence to tribal's. Each tribal family have its own cattle for ploughing, milk,meat and hides. All organic waste that is generated by a family is being consumed by cattle. No need of recycling, natural recycling of organic waste.
6. **STRONG VALUE SYSTEM-** Brave, chivalrous, lives in present and less bothered about tomorrow and easy going way of life. Despite the development pressure still tightly associated with the 3J's of mother nature Jal,Jangal or Jameen. The life of tribal is by for and to the above 3J's
7. **SIMPLE LIVING-** Tribal's have less or least pressure on economic resources due to their simple living associated with high values to nature.

Conclusion

Various innovative measures and steps have been taken by district administration, UMC and Smart City Limited Udaipur to manage waste in city area on recycling and reuse of waste, but still the public perception to reduce waste generation is missing and should be properly addressed as we are celebrating 150th birth anniversary of Father of Nation Mahatma Gandhi, who advocates to minimize need so far as possible, as our need can be accomplished but greed can't. It's impossible to make up city as smart without people's participation and involvement. Apart from improvement in infrastructure, local government should also focus on four zeros; zero hunger, zero poverty, zero unemployment and zero waste to achieve Sustainable Development Goals (SDG) targeted by UNDP. Its pressing need to expand the current scope of the smart city, In smart city Udaipur steps have been taken like Indra Rasoi, Urban Livelihood Mission and Raj Kaushal Application but lots need to be done to involve people. No need to go anywhere, people's participation, involvement and City First Approach transformed Dungarpur as Smart City without listed in GOI Smart City mission. If Dungarpur Why not Udaipur ?

Hope Udaipurites must think our it and involve themselves to transform city really as SMART CITY.

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