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HUDCO AWARDS FOR BEST PRACTICES TO IMPROVE THE LIVING ENVIRONMENT

A Compendium of the Award-Winning Entries

Award Cycle : 2023 - 2024

A HUDCO-HSMI Publication
World Habitat Day 2024 Release

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HOUSING AND URBAN DEVELOPMENT CORPORATION LIMITED

An ISO 9001:2015 certified organisation

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Housing and Urban Development Corporation Limited
New Delhi – 110 003

DISCLAIMER

The projects featured in this publication are the award-winning entries of the 'HUDCO Best Practices Award to improve the Living Environment' for the award cycle 2023-24. These award-winning entries have been selected by a specially constituted Jury Committee comprising of eminent professionals in the habitat sector. The information related to the featured projects has been provided by the respective participating applicant institution while submitting their application/ entry for the HUDCO Best Practices Award in the form of write-ups, presentation, and other accompanying material. HUDCO does not take responsibility for the accuracy, technical soundness, or completeness of the contents of these features projects/ contents of these entries and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use or reliance on the contents of this publication.

The contents given in this publication are for the general reference only and is not intended to replace the need for professional advice in any particular subject matter. Further, all the rights are with the respective owner/ promoter of the featured projects. For further information, kindly contact the respective participating institutions directly.

INDEX

Foreword i

Preface iii

Acknowledgements v

About the HUDCO Awards for the Best Practices to improve the Living Environment (2023-24) vii

Jury Committee Profile ix

Winners of the HUDCO Best Practices Award (2023-24) x

Theme: Environmental Management, Energy Conservation and Green Buildings

1. **Environmental and Social Sustainability: Green initiatives by IIM Indore;** (Winner: Indian Institute of Management Indore, Madhya Pradesh) 1

Theme: Housing, Urban Poverty, and Infrastructure

2. **SAMTA NYAY KENDRA (A centre for the mainstreaming of Transgender and High-Risk Communities);** (Winner: Association of Professional Social Workers and Development Practitioners [APSWDP], Manimajra, Chandigarh UT) 15

3. **Makkal Mandram- A Community Centre for Slum Inhabitants;** (Winner: Recycle Bin, Chennai, Tamil Nadu) 20

Theme: Sanitation

4. **IIT Gandhinagar- Green initiatives at its campus;** (Winner: Indian Institute of Technology Gandhinagar, Gujarat) 29

5. **Recycle and reuse of Sewage Water for Industrial grade water supply through Tertiary Treatment Plant;** (Winner: Surat Municipal Corporation, Gujarat) 38

6. **Quick Pass-Centralised digital pass issue system for septage collection, transportation, disposal and payment;** (Winner: Thiruvananthapuram Municipal Corporation, Kerala) 43

Theme: Urban Design and Regional Planning, Inner-City Revitalisation and Conservation

7. **Preserving Old Historical Heritage Temple, School and other Buildings;** (Winner: Jaipur Smart City Limited, Jaipur, Rajasthan) 49

Theme: Urban Governance

8. **Water Tanker Pass issuance and Monitoring system with mobile app;** (Winner: Thiruvananthapuram Municipal Corporation, Kerala) 61

Theme: Urban Transport

9. **Affordable, Reliable, Safe and Sustainable Public Transport in Indore;** (Winner: Atal Indore City Transport Services Limited (AICTSL), Madhya Pradesh) 68

10. **Kochi Water Metro Project (KWMP);** (Winner: Kochi Metro Rail Limited, Kochi, Kerala) 72

FOREWORD

With a view to recognise initiatives by various organisations in improving the living environment in our cities and towns, HUDCO had instituted "HUDCO Awards for Best Practices to improve the Living Environment" during the financial year 2011-2012. The objective was to create awareness among the policy & decision makers as well as urban managers by managing, sharing knowledge and dissemination among the stakeholders, , so that the lessons learnt from such best practices and innovative initiatives could be applied in similarly positioned other cities and towns as well. In addition, these are also used extensively in technical reports and such other policy and development activities and capacity building programmes.

Over the years, the HUDCO Best Practices Award, has recognised the best practices developed, adopted and implemented by various stakeholders such as urban local bodies (ULBs), state government agencies, non-governmental organisations (NGOs), community based organisations (CBOs) and other public and private sector institutions towards sustainable development through innovation, managerial skills, implementation efficiency and partnership between various stakeholders. The themes covered includes areas such as urban governance, urban transport, housing, urban poverty & infrastructure, environmental management, energy conservation and green buildings, sanitation, urban design, regional planning, inner-city revitalisation and conservation and disaster preparedness, mitigation and rehabilitation.

This year, HUDCO has received 44 entries for recognition under the HUDCO Best Awards. These entries were scrutinised and assessed by a specially constituted Jury Committee of eminent domain experts under the chairmanship of Prof. Chetan Vaidya, former Director, School of Planning and Architecture, New Delhi and former director, National Institute of Urban Affairs, New Delhi. The physical verification was carried out for shortlisted entries through HUDCO's regional offices in the respective regions. After detailed examination, the Jury Committee recommended 10 entries for the award.

I am pleased to note that the research and training wing of HUDCO, the Human Settlement Management Institute (HUDCO's HSMI) is bringing a compendium of the award-winning entries for the HUDCO award for the FY: 2023-24. I am confident that this publication would result in dissemination of these award-winning best practices and knowledge sharing among the stakeholders. This would also encourage other similarly positioned cities and towns to try and adopt and replicate some of these innovations with suitable modifications.

I commend HUDCO's HSMI for their efforts in bringing out this compendium documenting the award-winning entries for the HUDCO award and I have also suggested HUDCO's HSMI to formulate special workshops and capacity building programmes to further disseminate these innovative best practices. I also take this opportunity to congratulate all award-winning institutions for participating and for winning the award.

Sanjay Kulshrestha
Chairman & Managing Director, HUDCO

PREFACE

India has been experiencing rapid urbanisation in the last decade and consequently the urban population is projected to increase from 377 million in 2011 to 675 million by the year 2035 as per UN's projections. India has some of the largest urban agglomerations in the world. However, rapid urbanisation has also put immense pressure on the civic services and urban infrastructure in terms of housing shortages, air pollution, over-crowding and lack of adequate livelihood opportunities. To address the challenges posed by rapid urbanisation and its impact, there is a need for our urban managers and administrators to explore various innovative solutions including environment friendly and climate-change responsive technologies and strategies. Cities are said to be the engines of economic growth. With urban areas contributing about two-thirds to our GDP, how well India manages its urban development sector, will play a critical role in realising India's goal of becoming a developed nation- Viksit Bharat, by 2047, the 100th year of India's independence.

HUDCO, a leading techno-financial navratna CPSE, with its 54 years of contribution in the housing and urban infrastructure development sector, has been playing an important role through financing, consultancy services and capacity building initiatives to address the urban development needs of India. In this respect, for encouraging, sharing of innovative initiatives, which has contributed to the improvement in the living environment, HUDCO had instituted 'HUDCO Awards for Best Practices to improve the Living Environment' in the year 2011-12. Various stakeholders in the urban sector such as state government departments, parastatal agencies, urban local bodies, Non–Governmental Organisations (NGOs) and research and academic institutions have actively participated in the award process. The award winning entries have demonstrated innovative initiatives and would contribute towards helping address some of the urban challenges facing our cities and towns. The award consists of a cash prize of Rs. One Lakh, a Certificate and a Plaque. For the award-cycle 2023-24, ten awards winners have been announced and the same shall be presented to the winners.

I congratulate HUDCO's HSMI for their initiative in bringing out this compendium to document and disseminate the award-winning best practices and I sincerely hope that this publication would help in wider sharing of these best practices among the urban managers.

I also extend my heartiest congratulations to all the award winners and to all other participating agencies for sending their entries. I am confident that HUDCO's HSMI would continue to receive good participation in the future as well.

M. Nagaraj
Director (Corporate Planning), HUDCO

A NAVRATNA CPSE

Housing and Urban Development Corporation Limited (HUDCO)

Corporate Vision:

"TO BE A LEADING TECHNO-FINANCIAL INSTITUTION PROMOTING SUSTAINABLE HABITAT DEVELOPMENT FOR TRANSFORMING THE LIVES OF PEOPLE."

Corporate Mission:

"TO PROMOTE SUSTAINABLE HABITAT DEVELOPMENT TO ENHANCE THE QUALITY OF LIFE"

ACKNOWLEDGEMENTS

This compendium of the award-winning entries of the 'HUDCO Awards for the Best Practices to improve the Living Environment' for the award cycle 2023-24 has been possible with the sincere and dedicated support and cooperation of officials of HUDCO. I wish to take a moment to recognise the invaluable contributions of the officials who have played a very crucial role in completing the award process.

At the outset, it is my proud privilege to acknowledge the encouragement and support received from Shri Sanjay Kulshrestha, Chairman and Managing Director, HUDCO. On behalf of the entire team of HSMI, I wish to place on record our heartfelt gratitude to him for his guidance and support and for inspiring all officials of HSMI. I am also grateful to Shri M. Nagaraj, Director (Corporate Planning), HUDCO for his valuable inputs at various stages of the award process and for motivating us in bringing out the present compendium. I am also thankful to Shri Daljeet Singh Khatri, Director (Finance), HUDCO for all necessary aid extended in the award process.

I would also like to acknowledge with gratitude, the dedicated assistance provided by all Regional offices of HUDCO in disseminating the award announcement information and for the follow-up action with the applicant institutions to submit their entries. HUDCO's HSMI takes this opportunity to thank all Regional Chiefs and concerned officials for their sincere and dedicated efforts and for undertaking the physical verification of the shortlisted entries in a time-bound manner.

I wish to place on record a special thanks to all the participating institutions- state government agencies, NGOs, private-sector organisations and academic and research institutions for their participation in the award process by submitting their entries and hope that HSMI would continue to receive such overwhelming support from them in the future as well.

Our special thanks are also due to all the esteemed members of the specially constituted Jury Committee of domain experts led by Prof. Chetan Vaidya, with Prof. P.S.N. Rao, Dr. Renu Khosla, Dr. N.B. Mazumdar, Dr. K.K. Pandey, Dr. O.P. Agarwal, and Shri Hitesh Vaidya as members. We sincerely acknowledge the time and effort put by the Jury Committee for assessing the entries.

I wish to also acknowledge the timely processing carried out by the concerned officials and departments of HUDCO namely Administration, Finance, Public-relations, and Information Technology. Last but not the least, the sincere efforts of HSMI officials also deserves appreciation and accolades for bringing out this publication.

Varsha Punhani
Head, HUDCO's HSMI

ABOUT THE HUDCO AWARDS FOR BEST PRACTICES 2023-24

HUDCO Awards for "Best Practices to Improve the Living Environment" has been institutionalized since the year 2011-12 to encourage and acknowledge efforts in these areas and to motivate Government Departments/ Parastatals Agencies/Local Bodies/Development Authorities/NGO's/Private and Corporate Sector/Research and Academic Institutions etc. who have demonstrated outstanding initiatives to encourage innovative and sustainable projects.

HUDCO Best Practices gives award under the following 6 themes:

1. Environment Management, Energy Conservation and Green Buildings
2. Housing, Urban Poverty and Infrastructure
3. Sanitation
4. Urban Design, Regional Planning, Inner - City Revitalization & Conservation
5. Urban Governance
6. Urban Transport

Each Theme has the following sub-themes:

Theme 1: ENVIRONMENTAL MANAGEMENT, ENERGY CONSERVATION & GREEN BUILDINGS

Sub-themes: Innovative pollution reduction measures at city level, Urban greening, Application of Environmentallyfriendlytechnologies at city/building level, integrated assessment, monitoring and control, and "Green" accounting, tangiblemeasures for ecological sustainability at city/zone level, Energy conservation practices at building/city level, Appropriate andcost effective building materials and construction technology, Green buildings and Green building indicators & waterconservation measures/Rain water harvesting at City/building level.

Theme 2: HOUSING, URBAN POVERTY & INFRASTRUCTURE

Sub-themes: Affordable housing, Access to housing ,Access to housing finance/credit, Slum and settlement upgradingand improvement, Application of environment friendly building materials, Cost-effective urban housing including innovative,emerging and disaster resistant technologies in housing, Access to land/services for urban poor, Provision of basic services,Public-Private partnerships/Public-Private-Community partnerships & Community based capacity building/livelihoodgeneration solutions.

Theme 3: DISASTER PREPAREDNESS, MITIGATION & REHABILITATION

Sub-themes: Reduction of vulnerability, Civic awareness and preparedness, Contingency planning and early warning systems, Response capacity, Hazard and risk reduction and mitigation, post-disaster rehabilitation/reconstruction, Risk assessment and zoning, Gender specific risks and needs, Building bye-laws for disaster mitigation.

Theme 4: SANITATION

Sub-themes: Solid Waste Management, Sewerage management, Cost effective/eco-friendly/Innovative sanitationsolutions & Waste to energy solutions.

Theme 5: URBAN DESIGN, REGIONAL PLANNING, INNER-CITY REVITALISATION & CONSERVATION

Sub-themes: Smart City solutions, Sustainable/inclusive city planning, Innovative Urban design/New townshipdesigns, Innovative regional planning approaches, Urban renewal/Heritage conservation or retrofitting, Inner-cityrenewal/revitalization & Accessibility improvement for differently abled/vulnerable groups.

Theme 6: URBAN GOVERNANCE

Sub-themes: Urban management and administration, E-governance/Partnerships with civil society, Participatorybudgeting and decision making, Human Resources and leadership development, Decentralization/Devolution of powers,Institutional reforms, Transparency and accountability, Empowerment of Women, Innovative methods of collection ofproperty tax/other taxes/bills, Municipal double entry accounting and Improved service delivery initiatives.

Theme 7: URBAN TRANSPORT

Sub-themes: Mass public transport, Environmentally friendly public transport, Traffic bottleneck reduction planning,GPS based initiatives for transport improvement, Urban transport planning, Parking solutions, Transit OrientedDevelopment/Transit Corridor development & Last Mile connectivity.

The selection criteria are based on Planning and Implementation Processes, Innovativeness, Stakeholder'sParticipation, Resource Mobilisation and Impact, Sustainability and Replicability. A Jury Committee comprising of eminentprofessionals with diverse background in the habitat sector, scrutinise each entry received, as per selection criteria.

The Award consists of a cash prize of Rs. One Lakh each, a certificate, and a plaque. Up to 10 winners are selected for the Award every year.

JURY COMMITTEE

(For the Award Cycle 2023-24)

Chairperson

Prof. Chetan Vaidya

Prof. Chetan Vaidya is an architect planner with over 30 years long academic, research and consultancy experience of urban planning and development. Presently, he is Independent Director (Non-Executive) of GIFT city Gujarat, proposed financial capital of India.

Members

Prof. Dr. P. S.N.Rao

Prof. (Dr.) P.S.N. Rao is a well-known architect- urban planning expert of the country. Currently, he is Member, High Level Committee on Urban Planning, Ministry of Housing and Urban Affairs, Government of India.

Dr. Renu Khosla

Dr. Renu Khosla is Director of the Centre for Urban and Regional Excellence (CURE). Her work is aimed at unthinking and reimagining slum and inclusive urban development, nudging community- led initiatives that integrate, use an ecosystem and ecological approach to promote resilience.

Dr. N.B Muzumdar

Dr. N.B Muzumdar is an international waste management expert. At present he is Hon. Chairman, International Academy of Environment Sanitation and Public Health (IAESPH) since 2018 and Hon. DG, Sulabh International Social Service Organisation (SISSO) from March 2016.

Dr K.K. Pandey

Dr K.K.Pandey, Professor, Urban Management and Coordinator, Centre for Urban Studies at IIPA has over four decades of experience on extensive research, advisory services and capacity building on urban issues in the area of urban governance and finance.

Dr O. P. Agarwal

Dr O.P.Agarwal was a member of the INdian Administrative Service from 1979 to 2007. More recently, he was the CEO of the World Resources INstitute from June 2017 to September 2022. Currently, he is the Dean of the Indian School of Public Policy, in New Delhi.

Shri Hitesh Vaidya

Shri Hitesh Vaidya in his previous capacity as the Director of the National Institute of Urban Affairs (NIUA) played a pivotal role in addressing urban challenges through different lenses and significantly impacting the urban discourse. He is currently a senior Urban Management Professional.

Winners of the HUDCO Awards for Best Practices to improve the Living Environment (FY: 2023-24)

S. No.	Theme/ Category	Title of the Best Practice	State	Name of the Winner institution
1.	Environmental Management, Energy Conservation and Green Buildings	Environmental and Social Sustainability: Green initiatives by IIM Indore	Madhya Pradesh	Indian Institute of Management Indore
2.	Housing, Urban Poverty, and Infrastructure	SAMTA NYAY KENDRA (A centre for the mainstreaming of Transgender and High-Risk Communities)	Chandigarh UT	Association of Professional Social Workers and Development Practitioners (APSWDP)
3.		Makkal Mandram- A Community Centre for Slum Inhabitants	Tamil Nadu	Recycle Bin
4.	Sanitation	IIT Gandhinagar- Green initiatives at its campus	Gujarat	Indian Institute of Technology Gandhinagar
5.		Recycle and reuse of Sewage Water for Industrial grade water supply through Tertiary Treatment Plant	Gujarat	Surat Municipal Corporation
6.		Quick Pass-Centralised digital pass issue system for septage collection, transportation, disposal and payment	Kerala	Thiruvananthapuram Municipal Corporation
7.	Urban Design, Regional Planning, Inner-City Revitalisation and Conservation	Preserving Old Historical Heritage Temple, School and other Buildings	Rajasthan	Jaipur Smart City Limited
8.	Urban Governance	Water Tanker Pass issuance and Monitoring system with mobile app	Kerala	Thiruvananthapuram Municipal Corporation
9.	Urban Transport	Affordable, Reliable, Safe and Sustainable Public Transport in Indore	Madhya Pradesh	Atal Indore City Transport Services Limited (AICTSL)
10.		Kochi Water Metro Project (KWMP)	Kerala	Kochi Metro Rail Limited

Environmental and Social Sustainability: Green initiatives by Indian Institute of Management Indore (IIM Indore)

Indian Institute of Management Indore, Madhya Pradesh

BACKGROUND

The campus is situated on the foothills of the Vindhya Mountain range, at a scenic hillock, which highlights its unique and picturesque landscape. It lies between 22.6256°N latitude and 75.7910°E longitude. The IIM Indore campus is 193 acres (78 hectares) by area. The area presents a very rich and diverse assemblage of species due to the varied topography and climatic conditions. It comes under Malwa plateau which is in the western part of Madhya Pradesh. In this region, the main classes of soil are black, brown and stony soil. The volcanic, clay-like soil of the region owes its black colour to the high iron content of the parent basalt. The natural vegetation is tropical dry forest.

The IIM Indore campus is home to over 1,800 programme participants and over 150 families of teaching, non-teaching staff. IIM Indore flourishes 355 species, 241 genera and 96 families of plants, 50+ bird species (including migrants from Himalayas), 7 snake-species, a family of foxes, hares, rabbits, mongoose, cats, bats, and many species of lizards, chameleons, crabs, butterflies, spiders, flies, moths, and other insects.

Prior to the commencement of the initiative, the hilly terrain presented a desolate and rocky landscape devoid of any greenery. The absence of vegetation exacerbated water scarcity issues, with water runoff being a common occurrence on the hilly surface. The soil composition of the area is predominantly rocky, exacerbating the arid conditions. 20 to 30 % land area is in almost flat plains. 40 to 60 % land area is in slopes. The land consists of granular fragmented weathered rock and porous in nature. Additionally, the disposal of debris was a prevalent practice, utilizing the accessible land area for such purposes.

MOBILISATION OF RESOURCES

For better results, IIM Indore has recruited adequate human resources at different levels with a good honorarium, which has created a strong team that strives to give better results by working on all aspects of the environment. Not only this, for the institute provides full financial support to their families, their education, and other avenues to maintain the effectiveness and stability of human resources. Adequate budget has been set aside by the institute every year for all types of related activities, which also includes various types of technical facilities. Monitoring these activities is done effectively with the collective cooperation and monitoring of related departments such as accounting and financial department, electrical in technical group, project department etc.

THE PROCESS

In the initial stages of the initiatives, various challenges emerged. The primary obstacles encountered during this phase include:

1. **Initial Landscape:**
    - Before the initiative began, the hilly terrain exhibited a barren and rocky environment with no greenery.
    - Lack of vegetation intensified water scarcity problems, leading to frequent water runoff on the uneven surface.
2. **Soil Composition:**
    - The area predominantly featured rocky soil, worsening the already arid conditions.
    - The soil was granular with fragmented, weathered rock, characterized by porosity.

3. **Topography:**
    - Approximately 20 to 30% of the land was nearly flat plains, providing a relatively level surface.
    - A significant portion, accounting for 40 to 60% of the land, consisted of slopes, contributing to the challenging topography.
4. **Land Characteristics:**
    - The land comprised granular, fragmented, and weathered rock, adding to the difficulty of sustaining vegetation.
    - Porous nature of the soil hindered water retention and contributed to water runoff.

Image: IIM Indore's various departments mobilized for the initiatives

Image: Sanjeevani- The Horticulture Cell

Image: Before the initiative began, the hilly terrain exhibited a barren and rocky environment with no greenery

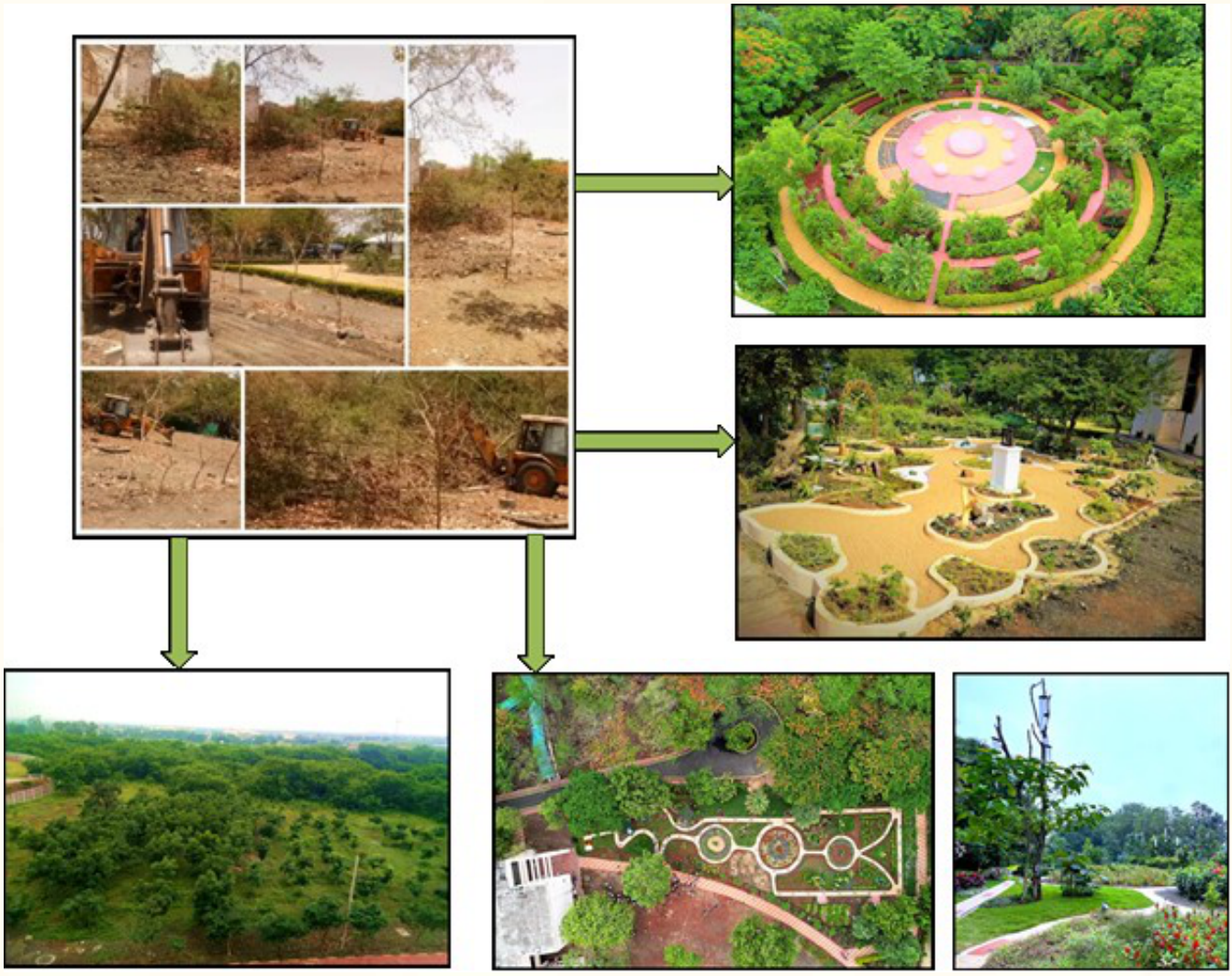

Image: Difference stages of development of landscape parks at campus

5. **Waste Disposal Practices:**

   - The disposal of debris was a widespread practice in the area.
   - Accessible land was utilized for debris disposal, further degrading the already challenging terrain.

In summary, before the initiative, the hilly terrain faced a multitude of challenges, including a lack of greenery, water scarcity exacerbated by runoff, rocky and porous soil composition, and prevalent debris disposal practices. Several green initiatives were taken to overcome the above hurdles; these are listed below:

1. **Sustainable Afforestation Initiatives**

   - A significant afforestation campaign was undertaken, resulting in the establishment of man-made forests.
   - This initiative notably increased soil water retention, mitigating surface water runoff.
   - Ongoing annual plantation drives, with 2,000 to 2,500 trees planted, demonstrate sustained commitment.

2. **Transformation of Barren Lands into Green Sanctuaries**

   - Vacant barren lands have been converted into vibrant green spaces, featuring themed gardens such as Spiritual, Anunaad (sound), and Zen gardens.

3. **Waste Management Excellence**

   - The institute focuses on comprehensive wet and dry waste management.
   - Proprietary wet waste processing machines are utilized to convert waste into natural manure, producing 9-10 thousand kilograms annually.
   - A dedicated waste management unit processes 8-10 thousand kilograms of waste, contributing to sustainable horticulture practices.
   - IIM Indore also has a wood-chipper machine that significantly accelerates the wood decomposition process from a two-year timeline to a mere six months.

4. **Water Conservation and Rejuvenation**

   - Rejuvenation of old water bodies and creation of large pits in forests to enhance groundwater recharge.
   - A rainwater harvesting pond with a capacity exceeding 17,000 kL has been revitalized.

5. **Efficient Wastewater Treatment**

   - Two treatment plants process campus wastewater, yielding 140-275 million liters of treated water annually.
   - Treated water is utilized for various purposes, including gardening, floor cleaning, and transportation cleaning.

6. **Natural Farming and Herbal Production**

   - IIM Indore established a 5,000-square-foot Natural Farming and Herbal Production Area in September 2020.
   - Chemical-free cultivation yields 10-12 tons of fruits, vegetables, and medicinal herbs annually, benefiting the community.

7. **Eco-Friendly Transportation and Energy Usage**

   - E-vehicles are employed for on-campus commute, to reduce pollution.
   - The institute utilizes a 460-kW capacity solar power plant, further contributing to sustainable energy practices. Through the utilization of this solar power facility, electricity consumption has been reduced by about 600,000 units. Additionally, a 1 kW Smart Solar Tree is planned to be installed on the campus soon.

Engagement of the IIM Indore Community:

In IIM Indore, the whole community contributes towards the environmental initiatives. Many initiatives are taken by the students for waste disposal, one of them is paper waste recycling initiative by IPM Social Club, IIM Indore. It was conceived to collect all used reading materials and other books, etc., that our IIM-I community has used. This collection is done and passed on to recycling vendors in Indore city. All profit incurred is used for rural primary school children. Another example includes the tree plantation drive conducted by Pragat-i, the social sensitivity cell of IIM Indore.


1


2


3


4

5

Images (1-5): Mass plantation drive conducted by Pragat-i, the social sensitivity cell of IIM Indore

At IIM Indore, every initiative involves the combined dedication of our community. Recently, IIM Indore community came together to participate in Swachhata Pakhwada. During this event, students, staff, and faculty collaborated to commence an ongoing journey towards maintaining cleanliness on the IIM Indore campus.

Image: Prof. Himanshu Rai, Director, IIM Indore, participating in the Swachhata Pakhwada together with the IIM Indore community.

RESULTS ACHIEVED

1. Improvement in the living conditions of the community:

Enhancing the community's living conditions is accomplished through the following measures:

- The presence of enriched plantations, greenery, and trees on the campus contributes to an impressive Air Quality Index (AQI), indicating a refreshing atmosphere with minimal pollution and a peaceful environment.
- Transformation of barren lands into lush, vibrant gardens establishes a conducive setting for meditation, offering a positive and tranquil space to alleviate stress and anxiety. The gardens offer an ideal setting for enhancing the mental well-being of both students and the community. In this tranquil and rejuvenating atmosphere, individuals engage in activities such as yoga, exercise, and meditation, to promote a sense of inner peace.

Image: Prof. Himanshu Rai, Director, IIM Indore, practicing yoga in the Spiritual Yoga Park.

Image: The Spiritual Garden offers a perfect environment for activities such as yoga, exercise, and meditation to promote a sense of inner peace.

- IIM Indore is a plastic free campus. This initiative creates a pollution free environment that directly enhances the living condition of the community.
- Implementation of the Green Office concept within various spaces such as offices and the library using indoor plantations fosters a healthy environment and aid in energy conservation, pollution reduction, and the overall preservation of nature.
- Through Natural Farming practices, a substantial quantity of vegetables, fruits, and herbs are produced, benefiting the IIMI community. The surplus is distributed among community members, and herbal boxes are provided to schools, hospitals, police stations, the high court, and guests at IIM Indore.
- The paper waste recycling initiative, spearheaded by the IPM Social Club at IIM Indore, involves collecting used reading materials and books for recycling in Indore city. Profits generated from this endeavour are directed towards supporting the education of rural primary school children within the IIMI community.
- The community is reaping the rewards of IIM Indore's outstanding waste management strategies. The effective handling and proper disposal of organic, inorganic, and hazardous waste play a crucial role in improving the overall living conditions.

2. Capacity transformation of organization, targeted area or community and implementing agency.

- Before the initiation of the project, the hilly expanse presented a stark scene with barren, rocky terrain and a notable absence of greenery. The soil composition was predominantly rocky. Water scarcity loomed due to runoff from the hilly surfaces. Additionally, debris disposal was prevalent in the available land areas.
- A significant afforestation campaign was undertaken, resulting in the establishment of man-made forests. This initiative notably increased soil water retention, mitigating surface water runoff.
- Vacant barren lands have been converted into vibrant green spaces, featuring themed gardens such as Spiritual, Anunaad (sound), and Zen gardens.
- For Waste Management, a dedicated waste management unit processes 8-10 thousand kilograms of waste, contributing to sustainable horticulture practices.
- For Water Conservation, the rejuvenation of old water bodies and the creation of large pits in forests enhances groundwater recharge. A rainwater harvesting pond with a capacity exceeding 17,000 kL has been revitalized.
- Two treatment plants process campus wastewater, yielding 140-275 million litres of treated water annually. Treated water is utilized for various purposes, including gardening, floor cleaning, and transportation cleaning.
- To utilize the available area, IIM Indore has established a 5,000-square-feet Natural Farming and Herbal Production Area which yields tons of veggies, fruits, and herbs.

3. Changes in the local, national, or regional, social, economic and environmental policies.

- Adoption of city squares and circles: IIM Indore is ready to embrace the incorporation of greenery and cleanliness at different locations in the city through the adoption of circles. This endeavour indicates our commitment to bringing about a holistic transformation, not limited to the campus, but extending beyond its boundaries.

- Plastic free campus: The institute has banned the use of single use plastic with the aim of becoming a "Zero Waste Campus." IIM Indore uses waste newspaper bags instead of plastic bags which are self-produced by the institute. Plastic bottles are not used on campus, and all community members use copper and glass bottles.

Image: IIM uses waste newspaper bags instead of plastic bags which are self-produced by the institute and Plastic bottles are not used on campus, and all community members use copper and glass bottles.

Wastewater treatment and its consumption: The wastewater from all over the campus is treated with 2 treatment plants. The quantity of treated water ranges 140-275 million litres annually which is used in storage tanks located at different locations. This water is used for gardening, floor cleaning, transport cleaning etc.

Waste Management and Composting Unit (Recycle): IIM Indore processs every day 8-10 thousand kilograms of food waste/ kitchen waste and dry waste by machine. After mixing and grinding process, the whole material is left for natural degradation, which gets converted into natural manure in few days. After the whole process, IIM Indore gets about 8000-9000 kg of manure every year. Manure processed from organic waste is then used within the campus a natural farming area and fruit orchard spread across 5000 sq. feet. In addition, it has a woodchipper machine that significantly shortens the two-year wood decomposition process to only six months.

ANVESHAN - Centre of Excellence for Waste Management and WASH: IIM Indore inaugurated ANVESHAN, Centre of Excellence for Waste Management and WASH (Water, Sanitation & Hygiene). With a grant of Rs. 19.95 Crore from the Ministry of Housing and Urban Affairs (MoHUA), ANVESHAN focuses on capacity building by training mayors, counsellors, and policymakers in waste management and WASH (Water, Sanitation & Hygiene). Through global collaborations with prestigious institutions such as the University of Denver, Rutgers University, the University of Glasgow, the University of Liverpool, and Bocconi University, IIM Indore aims to drive change at local, regional, national, and international levels.

Sustainable Transportation and Energy Consumption: Within the campus, electric vehicles are utilized to minimize pollution during commuting. The institution incorporates a solar power plant with a capacity of 460 kW, actively promoting sustainable energy practices. Through the utilization of this solar power facility, IIM Indore has reduced electricity consumption by about 6,00,000 units. Additionally, a 1 kW Smart Solar Tree is planned to be installed on the campus soon.

4. Addressing and recognition of issues and constraints both at local, regional, and state level.

IIM Indore actively tackles and acknowledges challenges and limitations at the local, regional, and state levels through the implementation of environmentally friendly initiatives. These include practices such as rainwater harvesting, wastewater treatment, utilization of solar power plants, installation of solar tree and electric vehicles, geotagging trees across the campus, comprehensive management of both organic and inorganic waste. Further, the cultivation of herbs, vegetables and fruits through natural farming methods, and the use of organic waste-derived manure is used via such natural farming. Moreover, the institute is engaged in the distribution of herbs to schools and hospitals in Indore city, and undertakes extensive plantation efforts to transform barren land into thriving green gardens.

5. Confidence built up in community, changes in behavioural attitude and responsibilities etc.

The entire IIM Indore community comprising students, faculty, and staff, has consistently participated in eco-friendly endeavours. Students consistently organize events such as tree plantation drives and waste management initiatives. The community is highly conscious of cleanliness and waste management, evident in the presence of separate bins for dry and wet waste. Members of the community responsibly segregate waste at the individual level. Additionally, to reduce pollution within the campus, electric vehicles are employed for in-campus transportation.

SUSTAINABILITY

IIM Indore's endeavours are designed to address diverse aspects of sustainability, with a particular emphasis on environmental, social, and economic parameters.

Environmental parameters: At IIM Indore, residents actively engage in sustainable initiatives, ensuring our commitment to environmental sustainability through a range of activities, as outlined below.

1. Rainwater Harvesting and Conservation:

- All buildings in the IIM Indore campus feature a dual sewerage system for both wastewater and rainwater.
- Rainwater is collected from various surfaces like rooftops and parking areas, channelled into ponds and channels on the premises.
- A significant rainwater harvesting pond with a capacity exceeding 17,000 KL ensures efficient water storage.
- Pits and ditches in the forests aid in groundwater recharge, and efforts to revive old water bodies have been successful.
- The campus undergoes an annual mass plantation drive, planting over 2500 native trees, with a dedicated team ensuring a 99% survival rate.
- Intensive man-made forests are developed, and compost from on-site waste nourishes the trees.

2. Wastewater Treatment and Reuse:

- Wastewater from across the campus is treated by two plants. Treated water, ranging from 140-275 million litres yearly, is stored in tanks for various purposes like gardening and cleaning.

3. Waste Management and Composting:

- IIM Indore has a separate Waste Management unit wherein an annual machine processes 8-10 thousand kilograms of food, and dry waste yields 8000-9000 kg of natural manure.
- The compost is used in the campus's Natural Farming area and a fruit orchard spanning 5000 sq. feet.
- Recently IIM Indore has inaugurated a Woodchipper machine which will turn a 2-year wood decomposition into just six months.

4. Adoption of Renewable Resources:

- The campus utilizes a 460 kW solar energy power plant. Through this, IIM Indore has reduced electricity consumption by about 600,000 units. Additionally, a 1 kW Smart Solar Tree will soon be employed on campus.
- E-vehicles are employed for on-campus transportation.

5. Plantations and Afforestation:

- Regular tree plantations, totalling 2 to 2.5 thousand annually, transform vacant lands into green areas.

6. Natural Farming:

- A 5,000-square-feet natural farming and herbal production area yields 10-12 tons of vegetables, fruits, and herbs annually for the IIM-Indore community.

7. **Conversion of Barren Lands:**

- Barren lands have been transformed into gardens such as the Spiritual Garden, Anunaad-Sound Garden, and the Zen Garden.
- A dilapidated, vermin-infested erstwhile TB Sanatorium on campus which later housed scrap has now been renovated to house plants and herbs instead and is called 'Sanjeevani: The Horticulture Cell.'

8. **Green Office Concept:**

- All offices, learning centres, and common rooms adhere to the green office concept, integrating indoor plantations for a healthier environment, energy conservation, pollution reduction, and nature conservation.

9. **Plastic-Free Campus:**

- The institution has implemented a prohibition on the utilization of disposable plastic, striving to transform into a 'Zero Waste Campus.'
- Instead of plastic bags, the campus produces eco-friendly bags from recycled newspapers.
- Plastic bottles are strictly prohibited within the campus, and all community members exclusively use copper and glass bottles.

Social and Economic parameters: The impact of IIM Indore's sustainability initiatives on social and economic parameters is evident through the following examples:

1. **Rural Engagement Programme (REP):**

Rural Engagement Programme (REP) is a unique initiative instituted with an objective to sensitize budding managers and entrepreneurs at the Institute to various schemes undertaken by the government in villages, and to study and analyse their execution and effectiveness. The entire set of participants is uniformly divided into groups of 10 each, based on their own choices. The entire programme is organized in coordination with the Madhya Pradesh Mantralaya, Bhopal.

The entire week is characterized by visits to various blocks in the district where students critically analyse execution plans of numerous government schemes and survey villages to observe the actual level of implementation. Through this process, they assess the challenges that faced while executing the schemes and while identifying operational gaps that could possibly be bridged through better planning and management strategies.

Image: Glimpses of IIM Indore's Rural Engagement Program (REP)

2. Cleanliness Drives: The commitment to cleanliness resonates across our campus, and through the active participation in India's 'Swachh Bharat Abhiyan.' Supported by ANVESHAN, our Centre of Excellence for Waste Management and WASH (Water, Sanitation & Hygiene), IIM Indore takes a leading role in organizing Cleanliness Drives. These initiatives extend beyond the campus, reaching various parts of the city as well.

Image: Prof. Himanshu Rai, Director, IIM Indore, participating in the cleanliness drive together with the IIM Indore community.

Image: Members of the IIM Indore community came together to take a pledge during Swachhta Pakhwada to keep their surroundings clean

Image: IIM Indore's IPM students conducting a cleanliness drive at the Indore Zoo

3. Community Well-being:

The IIM Indore community benefits from a serene environment adorned with greenery and lush gardens, fostering mental peace. The plastic-free campus contributes to low pollution levels.

4. Adoption of Sustainable Technologies:

The emphasis on fostering innovation for sustainable economic development is apparent using renewable energy sources instead of non-renewable ones.

5. Circular Economy:

The promotion of recycling and reuse practices is evident in the campus's use of paper bags, and wastewater treatment for various purposes such as gardening, and the responsible management of sewage water.

6. Waste Reduction through Circular Economic Models:

A systematic approach to handling organic, inorganic, and toxic waste includes decomposing organic waste into manure for horticulture. The recent implementation of a woodchipper machine accelerates the decomposition of wood logs.

7. Health and Safety:

The commitment to a healthy living environment is underscored by growing, harvesting, processing, packing, and distributing herbs like Giloy, Ashwagandha, Tulsi, and Bhringraj throughout the IIM Indore community.

8. Distribution of Sanitary Napkins:

As part of its commitment to social sustainability, IIM Indore has undertaken an admirable initiative involving the free distribution of sanitary napkins to its female members employed in various roles such as housekeeping and security. This monthly distribution not only reflects the institute's dedication to promoting hygiene, but also emphasizes its inclusivity by deploying this essential provision free of cost.

Image: Distribution of sanitary napkins to female members employed in various roles such as housekeeping and security at IIM Indore

9. Job creation and livelihood:

Sustainability initiatives at IIM Indore contribute to job creation and livelihoods. Various departments including horticulture, projects, estate, accounts, and human resources, actively participate, fostering employment opportunities.

TRANSFERABILTY

IIM Indore has already mentored another institute to start the Rural Engagement Program there. Besides, several institutions including corporates have visited us and are replicating our spiritual garden in their premises. This work can be replicated and help other institutes and organisations to make their environment green, healthy, and eco-friendly. Any educational organization can adopt the water conservation and waste management model of IIM Indore to maintain sustainability on their campus. Such campuses can start a green campus initiative to increase aesthetic value and foster a healthy environment. Our model can especially be replicated because it is a self-sustainable model which any campus can adopt.

IIM Indore's work is not a replication or modification of other practices. While IIM Indore consistently encourages visitors from worldwide to incorporate our initiatives into their organizations, its focus is on implementing environmentally friendly practices. Through these green initiatives, it aims is to preserve the environment and promote sustainability, ultimately contributing to the creation of a better world for all to inhabit.

LESSONS LEARNED

According to IIM Indore, primary motivation for these initiatives has been the acknowledgment of 'Challenges.' Throughout this journey, it has encountered various obstacles that have inspired to actively address and overcome them. An illustrative example is the campus location atop a rocky hill, where the soil is infertile, and there is a notable absence of trees, coupled with water scarcity.

IIM Indore says that these challenges served as catalysts for these transformative initiatives, leading to convert the barren land into a lush green campus. In response to water scarcity, it took proactive steps by implementing wastewater treatment plants and adopting rainwater harvesting practices. To effectively manage waste, a dedicated waste management area was established, converting waste into valuable manure. Be it solar energy utilisation, natural farming, or plastic ban, one after another, IIM Indore kept adding various levels to our initiatives.

Additionally, their motivation extends to environmental conservation and they are deeply committed to safeguarding the environment. At IIM Indore, the community, not only champion environmental protection but also fervently advocate for sustainable living practices and their unwavering dedication to cultivating green spaces reflects the solemn pledge to preserve the planet for future generations.

REFERENCES


CITY ACTIVITY

वेदों में 27 नक्षत्रों के जिन 27 दुर्लभ वृक्षों का उल्लेख है वो पौधे लगाए गए इस उपवन में, रत्नों की तरह ये भी करते हैं मन-मस्तिष्क पर असर

At spiritual garden, breathe in peace & exhale stress

A STRESS-FREE ENVIRONMENT

Image: Newspaper clippings showing green initiatives by IIM Indore

Title of the Best Practice	:	Environmental and Social Sustainability: Green initiatives by IIM Indore
The location of the Best Practice	:	Indian Institute of Management, Indore (Madhya Pradesh)
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SAMTA NYAY KENDRA (A Centre for the mainstreaming of Transgender and High-Risk Communities)

Association of Professional Social Workers and Development Practitioners (APSWDP), Manimajra, Chandigarh UT

BACKGROUND

The initiative seeks to address the legal needs and grievances faced by transgender persons, who often encounter discrimination, marginalization and struggle personal to live a decent life with livelihood.

The Samta Nyay Kendra initiative, implemented by the Association of Professional Social Workers and Development Practitioners (APSWDP), is a pioneering effort aimed at providing free legal aid services, extended social, and counselling support, and network exclusively to the transgender community in Chandigarh. It was established in collaboration and mentorship support from the District Legal Services Authority (DLSA), State Legal Service Authority (SLSA) Chandigarh, and the Chandigarh State AIDS Control Society, Chandigarh.

At its core, the vision of the Samta Nyay Kendra is to ensure equitable access to justice and rights for transgender persons. Its role extends beyond legal aid, the Kendra also provides comprehensive support services, including counselling, psychosocial support, and assistance with accessing social security schemes. By empowering transgender individuals to assert their rights and access redressal for their grievances, the initiative aims to foster inclusivity within society and raise awareness about transgender rights.

The participatory agencies, including the DLSA and the Chandigarh State AIDS Control Society, collaborate closely with APSWDP to provide financial, logistical, and operational support for the Kendra's activities. Together, these stakeholders work towards creating an enabling environment where transgender individuals can seek legal assistance and support without fear of discrimination or bias.

Currently, the Samta Nyay Kendra is fully operational at its designated location in Chandigarh, offering a range of services tailored to the needs of the transgender community. These services include counselling, referral and linkages to essential services, formation of self-help groups, enrolment in social security schemes, and provision of free legal aid through DLSA panel lawyers. Through its efforts, the initiative aims to create a more equitable and inclusive society where all individuals, regardless of gender identity, can access justice and exercise their rights freely.

In summary, the Samta Nyay Kendra initiative represents a significant step towards addressing the legal needs of the transgender community in North India. Through its holistic approach and collaborative efforts, it serves as a beacon of hope for marginalized individuals seeking justice and empowerment.

The Samta Nyay Kendra initiative, spearheaded by the Association of Professional Social Workers and Development Practitioners (APSWDP), was established in Chandigarh to address the legal needs of the transgender community. In collaboration with the District Legal Services Authority (DLSA) and the Chandigarh State AIDS Control Society, this initiative seeks to provide free legal aid services exclusively to transgender individuals who often face discrimination and marginalization in society.

ESTABLISHMENT OF PRIORITIES

The primary focus of the Samta Nyay Kendra initiative is to prioritize the legal rights and grievances of the transgender community. Key priorities include providing counselling, psycho-social support, referral and linkages to essential services, formation of self-help groups, enrolment in social security schemes, and provision of free legal aid through DLSA panel lawyers. These priorities are established to empower transgender individuals to assert their rights and access redressal for their grievances in an inclusive and supportive environment. At present, APSWDP is catering to more than 300 transgenders in the city in various aspects.

MOBILIZATION OF RESOURCES

The initiative mobilizes resources through collaborative efforts between APSWDP, the DLSA, and the Chandigarh State AIDS Control Society. Financial, logistical, and operational resources are pooled together to support the implementation of Samta Nyay Kendra's activities. Additionally, efforts are made to leverage government support, particularly from DAY- National Urban Livelihood Mission, Municipal Corporation Chandigarh and community partnerships through TG DERAs particularly Mangalmukhi TG Dera to enhance the reach and impact of the initiative. Through effective resource mobilization, the initiative aims to ensure the sustainable delivery of services to the transgender community. Two (2) Self-Help Groups comprising of 20 TGs identified among registered HRGs under the project and got linked under DAY NULM for livelihood generation activities. Two SHGs are given Operation and Management Contracts for running Public Toilet and Cleanliness activities in Chandigarh. In addition, few TGs have been empowered to take credit under PM SVANidhi scheme from Banks for their small social enterprises and also were linked to skill trainings.

FINANCIAL PROFILE

Organization	FY 2021-22	FY 2022-23	FY 2023-24	TOTAL	
	Amount (in Rs.)				Remarks
CSACS	17,37,144	18,30,230	27,50,450	63,17,824	Full cost of implementation of entire project.
SLSA					Paralegal Volunteers and Panel lawyer engagement.
PNB	CSR support in kind for arrangement of equipment's like LED Screen, Water Purifier and Water Dispenser for visiting HRGs. (Approx. 50,000.00)				
APSWDP Members	Small Library Set up for TG Literature, Regular Newspapers for reading, indoor games, musical instruments etc. (Approx. RS. 20,000.00)				

PROCESS AND RESULTS ACHIEVED

The implementation process of Samta Nyay Kendra involves various stages, including needs assessment, service planning, outreach, service delivery, and monitoring and evaluation. Since its inception, the initiative has achieved significant results in providing essential legal aid services to the transgender community. These include the successful establishment and operationalization of the Kendra, provision of counselling and support services, enrolment of transgender individuals in social security schemes, and provision of free legal aid through dedicated panel lawyers. Moreover, the initiative has contributed to raising awareness about transgender rights and promoting inclusivity within society. Through its efforts, the initiative has empowered transgender individuals to access justice, assert their rights, and lead dignified lives free from discrimination and getting their Identity Cards from ministry portal for the first time. APSWDP is regularly working on their IDs processing which is a cumbersome work with procedures, till date processed more than 60 IDs.

SUSTAINABILITY

Financial Sustainability: The project's financial sustainability is ensured through various means, including collaboration under government agencies for resource allocation, seeking grants from CSR and philanthropist organizations, and exploring opportunities for individual micro sponsorship and individual donations from APSWDP members too. Additionally, the project aims to establish and get Transgender linked to income-generating activities through SHGs through kendra to supplement and ensure long-term sustenance.

Social and Economic Sustainability: Samta Nyay Kendra promotes social and economic sustainability by empowering transgender individuals through legal aid, counselling, and support services. By facilitating access to justice and advocating for transgender rights, the project contributes to social inclusion and economic empowerment. Furthermore, by assisting in the enrolment of transgender individuals in social security schemes and providing linkages to livelihood opportunities, the project enhances economic resilience within the transgender community.

Cultural Sustainability: The project fosters cultural sustainability by promoting awareness and understanding of transgender rights and issues within society. Through legal awareness campaigns, cultural sensitization workshops, and community outreach programs, the project aims to challenge cultural norms and stereotypes surrounding gender identity and expression, thereby fostering a more inclusive and accepting cultural environment. APSWDP has been organizing various events like Swachh Holi with transgender community in order to make their culture intact alongside of their mainstreaming.

Environmental Sustainability: While the primary focus of the project is on social and legal empowerment, efforts are made to ensure environmental sustainability by adopting eco-friendly practices in Kendra operations. This may include minimizing paper usage, promoting energy efficiency, and implementing waste management strategies to reduce the project's environmental footprint. Though TG SHGs are being roped in the cleanliness campaign in the city under SBM too.

Institutional Sustainability: Institutional sustainability is maintained through the establishment of robust governance structures and partnerships with relevant stakeholders. By collaborating with government agencies, legal institutions, civil society organizations, and community leaders, the project builds institutional capacity and fosters a supportive ecosystem for sustainable service delivery. Additionally, the project invests in capacity building and training initiatives to ensure the continued effectiveness and relevance of the Kendra's activities in the long run.

Transferability

The Samta Nyay Kendra project offers valuable insights and lessons that can be applied to similar initiatives addressing the legal needs of marginalized communities. Its transferability lies in the following aspects:

- **Replicable Model:** The project's model of establishing legal aid clinics exclusively for the transgender community can be replicated in other regions and jurisdictions with similar legal frameworks and social contexts. By adapting the project's approach to local needs and sensitivities, similar initiatives can effectively address the legal challenges faced by transgender individuals elsewhere.
- **Collaborative Partnerships:** The project's success is attributed to its collaborative partnerships with government agencies, legal institutions, and civil society organizations. This collaborative approach can be replicated in other settings to leverage resources, expertise, and support for sustainable implementation. In the project, partnership was built with the Regional Institute of Cooperative Management (RICM) under Ministry of Cooperation, Govt. of India for capacity building and training of TGs on cooperatives and Self-Help Groups.
- **Capacity Building:** The project's emphasis on capacity building, including training for legal professionals, para-legal volunteers, and community members, is essential for ensuring the effective delivery of legal aid services. Similar initiatives can prioritize capacity building to enhance the skills and knowledge of stakeholders involved in legal empowerment efforts.

LESSONS LEARNED

Community Engagement: The project highlights the importance of community engagement and participation in legal empowerment initiatives. By involving transgender individuals in decision-making processes, outreach activities, and awareness campaigns, the project builds trust, ownership, and sustainability within the community.

Legal Awareness: A key lesson learned is the significance of legal awareness and education in empowering marginalized communities. By providing legal literacy programs and workshops, the project equips transgender individuals with the knowledge and tools to navigate the legal system and assert their rights effectively.

Holistic Approach: The project's holistic approach, which combines legal aid with psychosocial support, counselling, and referral services, underscores the importance of addressing the multifaceted needs of marginalized populations. Similar initiatives can adopt a comprehensive approach that addresses the social, economic, and psychological dimensions of legal empowerment.

In summary, the Samta Nyay Kendra project offers valuable insights into the transferability of its model and the lessons learned in promoting sustainable legal empowerment for marginalized communities. By leveraging collaborative partnerships, prioritizing community engagement, and adopting a holistic approach, similar initiatives can effectively address the legal needs of marginalized populations and promote social justice and inclusion.

REFERENCES

Image: A snapshot showing a project activity

Image: A snapshot showing a project activity at the kendra

Image: A snapshot showing a project activity at the kendra

CONTACT INFORMATION

Title of the Best Practice Risk	:	SAMTA NYAY KENDRA (A centre for the mainstreaming of Transgender and High- Communities
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Makkal Mandram - A Community Centre for Slum Inhabitants

Recycle bin (*A Private Sector Organisation*), Chennai, Tamil Nadu

BACKGROUND

Makkal Mandram (built-up area 7,283.72 sq. ft.) is located in the Pumping station slum Chinthadripet, Chennai, Tamil Nadu. Among slum settlements (400 houses), the majority of inhabitants are labourers working for private sector industries and firms. Women and children constitute the most affected group due to poor infrastructure, sanitation, and hygiene issues. Given that most family members are employed, the younger generation frequently experiences insufficient attention and unmet needs. The site initially was a dump yard consisting of two dilapidated buildings (Anganwadi and a community hall) which were demolished by retaining the trees. The site carries a negative reputation among its inhabitants and is frequently subjected to acts of vandalism and illegal activities. This perception contributes to a sense of insecurity and undermines the overall well-being of the community. The design of the Makkal Mandram is such that it integrates multiple functions that keep the space active throughout the day.

PROJECT INTERVENTION

To develop Makkal Mandram as a democratic space for the slum with around 400 dwelling units with a population of 2000 people. The slum facing issues like living beyond minimal space for dwelling units and a narrow street of 1.5m meandering through has developed an unhealthy living ecosystem in terms of hygiene practices, sanitation, access to water, monetary burden to women, higher dropout rates among adolescent kids and drug abuse among the youth. Hence the process of building was initiated as a socially driven exercise where built interventions appear as a product of design strategizing social context.

Project intervention hence includes initiating slum parliament and running the same for 24 months and engaging the participatory model to develop the community space model. Hence the brief is not prepared from outside, instead the brief of the space was developed by the social process. The slum parliament will be the anchor and the guard of the Makkal Mandram.

The decision of converting the waste landfill area anchoring anti-social elements were jointly identified to be converted to Makkal mandram by the community members.

The livelihood component was initiated with multiple units namma sandai (a provision shop), kilai (a nursery with slum contributing on eco restoration of the city), pavai (a unit that does value addition to fabric waste city is discarding), karai (a unit that contributes to the hygiene product industry of the city) was initiated and Makkal mandram houses the anchor space for housing the units and space for generating more as well.

Anganwadi was being temporarily placed in a gym building with minimal facilities. Makkal madram also houses the same and spaces are designed to make kids a key stakeholder in the habitual treatment of the spaces.

The open space components are shaped to make the space more multipurpose to anchor various socializing rituals and interactions in the community with increased plinth area for holding multipurpose activities.

The landfill site with dilapidated buildings have been converted by clearing the debris, saving the trees to convert them to ecological landmarks, bringing physical infrastructure including street lights.

MAIN FOCUS OF THE BEST PRACTICE

a) Provision of basic needs for inhabitants

b) Access to land/services for the inhabitants

c) Citizen participation in urban governance

d) Convergence model: convergence of government departments

e) Equitable access to resources

KEY DATES

DATES (days-month-year)	Significance/Achievement
19-August-2021	Establishment of First slum parliament in Pumping station slum, Chintadripet, Chennai
05-June-2023	Laying stones for the construction work of Makkal Mandram
04-February-2024	Inauguration of Makkal Mandram

MOBILISATION OF RESOURCES

The total cost of the project is INR 66,80,000. The funding for Superstructure was carried by GCC (Greater Chennai Corporation) under 'Namakku Naame Thittam' (Urban) scheme - INR 48,70,000. The plinth cost was covered by CSR Funding - INR 18,10,000. The project execution was overseen by Team Recycle Bin, while Team Cheer was responsible for monitoring and managing the allocation of resources throughout the project duration.

Sources of Organizational financing	FY 2023	FY 2024	TOTAL
CSR Funding	INR 18,10,000	-	INR 18,10,000
GCC 'Namakku Naame Thittam' (Urban) scheme	INR 24,83,700	INR 23,86,300	INR 48,70,000
Total Budget			INR 66,80,000

PROCESS

The process was initiated two years back as a design process responding to social context. The built elements presented as Makkal Mandram is hence an evolved product of social process. Here the design brief was never predefined with imitating similar activities as a prototype. Instead, the brief was informed by the learnings from the social process that got initiated on site before 2 years of making the building.

Slum parliament:

- It is a convergence model.
- It comprises a council, an executive committee and a working committee
- Its accomplishment lies in delivering governance directly to the doorstep of the community.
- By enhancing the decentralized infrastructure delivery, relieves the local self-governance mechanism from the negligence of monitoring nooks and corners of their jurisdiction area.
- Public follow up and monitoring system evolving as a new model of O&M.
- Channelizing voices and hence converting them to innovations in modes of infrastructure delivery.

10 Verticals that address all aspects of slums were formed: 1. Project habitat, 2. She project, 3. Skill bank, 4. Eco bank, 5. Project toilet, 6. Zero waste, 7. Kutty project, 8. Health capital,9. Project Art, and 10. Rights Literacy.

She projects (Suyam): it is the pivot of the process, Women as the major agents of livelihood. Livelihood being the pivot of the project, Suyam was initiated as an entrepreneurship drive that would convert cities' problems to slum's enterprises. One broad vision here is to hence convert the city's association with slums as "cheap labour hiring" mode to "collaborating to enterprise with dignity" mode. This social process has led to one component in Makkal Mandram".

Kutty project: as Mind lab in Makkal Mandram. A significant majority of the youth in Pumping Station Slum, particularly boys, opt for livelihood opportunities in close proximity to their residences, often leading to school dropouts. These young individuals typically seek small-scale employment or enter early marriages. Consequently, the absence of youth engagement is evident in community initiatives. Mindlabs aims to address this gap by specifically targeting young aspirants, who may be artists, athletes, musicians, and others. As a result, Mindlabs will function as a hatching pad for these aspirations, providing a platform for the growth and development of the youth in the community. The Mind Lab also hosts the Police Youth Club, serving as a channel for a government department's community initiatives.

Anganwadi: they are designed and executed with built elements responding to the ergonomics of the kids.

Slum parliament: meetings/gatherings going to be housed in Makkal mandram. The open spaces are all carved out to host communities socializing rituals.

Community Kitchen: In slum households, having an additional space for a kitchen is considered a luxury due to the constrained size of their living quarters. Consequently, numerous families cook on the streets, sharing communal cooking spaces, which has become an inherent practice passed down through generations. Therefore, provision of a community kitchen inside Makkal Mandram is given.

Toilets: presently there are only 3 toilet blocks for 400 families in the pumping station. To meet the basic sanitation needs, toilets are provided inside Makkal Mandram for its inhabitants.

Open spaces: as an anchor for housing community practices.

RESULTS ACHIEVED

Makkal Mandram has successfully transformed into a positive communal space that fosters a sense of safety and a healthy environment for both slum inhabitants and others. The transformation is notable as it has shifted from being perceived as a negative environment to becoming a positive communal gathering space. The community-driven initiatives especially Anganwadi and SHG's have made a significant impact on the overall well-being and perception of this space. Makkal Mandram now also serves as a venue for slum parliament meetings (a body formed by the people of slum for people in slum, where residents gather to discuss and address their rights, issues and challenges). There has been a noticeable change in people's behaviour, with a significant decrease in vandalism observed on the site.

1. The slum parliament's local self-body components and verticals converge with various local bodies, becoming stakeholders in sectors anchored by the Makkal Mandram, achieving convergence of social and governance stakeholders through built infrastructure. This shift in participation and perspective among local officers has occurred since the initiation of the slum parliament.
2. The space elevated the livelihood, providing validation for the community to initiate enterprising livelihood practices. The project's holistic inception ensured the meaningful evolution and coincidence of both livelihood generation and spatial infrastructure components.
3. The space has brought about significant changes in community perspective and behavioural practices, with visible improvements in hygiene, productive gatherings, and mutual awareness-raising efforts. The broad concept of convergence in this space has expanded the boundaries of how people gather and channelize their social energy for the greater good, impacting both the community and the governance body.
4. The Makkal Mandram is a scalable model with the potential to exert a considerable impact at both city and state levels by shaping developmental models specifically designed for informal communities.

SUSTAINABILITY

SOCIAL SUSTAINABILITY:

- Social process has been the foundation.
- Participatory model has developed the project brief.
- The decision-making process, including naming it "Makkal Mandram," involved people, with ownership resting with them.
- The cyclic process of people shaping the space and the space influencing perspectives and behavior is evident.
- Gender, particularly women, plays a crucial role in the livelihood project - Their presence makes them the guards and guide of the place. Anganwadi makes the place child friendly and with women and kids playing a key role the inclusivity grades of the place practically stay high.

- The space has been developed and intervened by, for and of the people.

ECONOMIC SUSTAINABILITY:

- Made through the scheme, "Namukku Naame Thittam " with 49% of the fund being contributed from Greater Chennai Corporation (GCC) and 51% CSR.
- More than a profit motive, the programmatic structure is designed to make it economically self-sustainable.
- By focusing on livelihood, the space can sustain itself economically, benefiting the people and managing maintenance for both built and open space components, including the landscape.
- The social capital is a key agent in the economic sustainability as the community themselves guards and contributes to the maintenance.
- The space is envisioned to enhance city-slum interaction, offering a unique perspective and generating revenue for the community.

SUSTAINABLE POLICY IN THE MAKING:

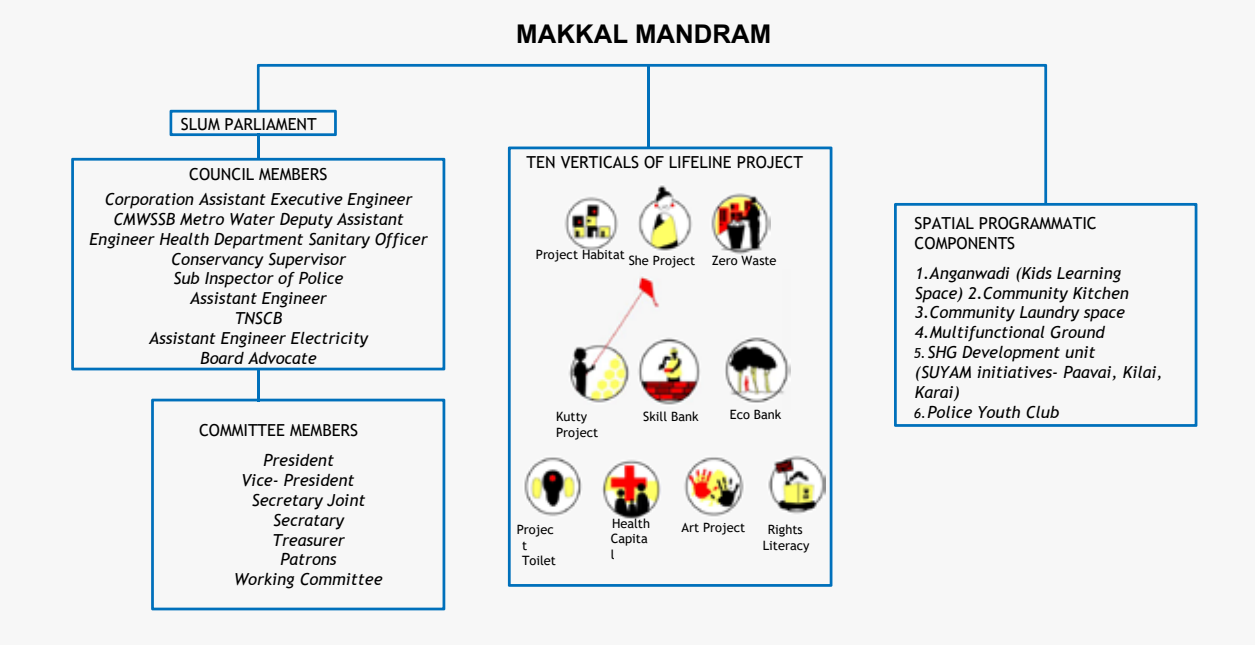
Policy for slum parliament is framed and upon implementation, it can make a scalable impact on informal settlements

- Now the possibility of making a policy for spatially scaling up 'Makkal Mandram' as a spatial reflection of slum parliament is in the making. The scalability is possible in terms of the building typology, materials used, and the program designed as the function of building.
- As a policy that could be scaled, Makkal mandram will make significant changes in the community building exercises that would enhance the quality of life in informal settlements.
- The major stakeholder, Greater Chennai Corporation (GCC), can be the nodal agency to scale up. TNUHDB also becoming a stakeholder. Other stakeholders for the 10 verticals will be supporting stakeholders with slum parliament anchoring the same.

TRANSFERABILITY

Policy is the model of scalability

- Slum parliament as a policy - Spatial and programmatic (function of the space) has every potential to be scaled up.
- The spatial components under slum parliament such as Makkal mandram are designed with typologies to scale up as a simple combination of units and plinth extension that can house multifaceted activities in a slum.



LESSONS LEARNED

Foundation of the practice of Recycle bin is to respond to externalities in societies through the act of design. Slums are externalities with complex layers. Design application conventionally starts and ends with the act of building houses in informal settlement. Here we chose to start with a social process of channelizing social energy and all the interventions becomes product of the social process. Slum being an externality with no models of fairly solving the same has been the motivation to generate a process and intervening becoming a learning process has fuelled the process further.

Slum dwellers international being an international movement has inspired the design strategy of the social process, aranaya housing has inspired as context driven building process as case studies that inspire. They have helped in addressing challenges in driving the community to coincide with ideas regarding working for common wellbeing in their spaces. Intelligence of the group has successfully channelized common willpower as slum dwellers international has successfully done. Aranya housing has shown us how the space carving can come out from a design process that responds to the physical and social context and how it will influence the behavior and in turn how the behavior will influence and shape the space back.

In case of a scale up, or transfer, the main crux is to pick the right clues from the ground and design from there. Each community has its own DNA as much as they have collective patterns. The life of all intervention depends on how much it is rooted to and originates from the inherent patterns of the community. The clues lie in observing the voices, the collective behavior patterns at the more intrinsic level, and that sums up to the cultural heritage of all communities. Without understanding the same, the interventions become aliens. Alienation is the first step to abandonment. What lies in ahead of abandonment is where we often see the origins of crimes as well. On the other side, tapping the same would give miracle like impact on scales that are unpredictable as well. This is where any intervention would touch the scale of a human smile.

Image: A View of Makkal Mandram

Image: A View of Makkal Mandram Exterior view of SHG units

Image: Interior of SHG unit

Image: Exterior view of Anganwadi

Images (1 to 4): A study Model views for various built up structures of Makkal Mandram project

Image: Interior view of Anganwadi

Image: Exterior view of Mind lab

REFERENCES

Image: Inauguration function of Makkal Mandram

An Artist's Sketch showing different project components of Makkal Mandram

Image: Greater Chennai Corporation (GCC) Twitter post of Inauguration function

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CONTACT INFORMATION

Title of the Best Practice	:	Makkal Mandram- A Community Centre for Slum Inhabitants
The location of the Best Practice	:	Pumping station slum, Chintadripet, Chennai, Tamil Nadu
Name of the Winner (Name of the Applicant Institution)	:	Recycle bin (A Private Sector Organsiation)
Address	:	75, Central Avenue Road, Taylor Estate, Kodambakkam, Chennai- 600024, Tamil Nadu
Contact Person	:	Ms. Ganga Dileep C.
Phone / Fax No.	:	+91 82819 63374 ; 7200272681
Email	:	lifelineproject.bin@gmail.com
Website	:	

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IIT Gandhinagar – Green Initiatives at its Campus

Indian Institute of Technology Gandhinagar, Gujarat

BACKGROUND

During the planning stages of construction of its permanent campus, IITGN had a vision of being a zero discharge, zero waste campus. With this vision, an eco-friendly sewage treatment plant (STP) was established at the campus along with other instruments such as biogas plant and compost pits for proper solid waste disposal. Specialized agencies have been engaged for proper disposal of recyclable, sanitary and e-waste. These practices have been in-place at IITGN since the commissioning of its permanent campus in Palaj, Gandhinagar. IITGN also engages actively with the community inside and in the neighbouring villages to promote good practices pertaining to sanitation and waste management, and has included cleanliness thinking in its curriculum through the Foundation Program, a five-week compulsory program for first year undergraduate students. IITGN also takes pride in establishing clean living environment for the construction workers engaged in the development of new upcoming buildings in the campus.

- Geographic area of IITGN: 16,26,838 m^2.
- Approximate population (on campus): 4,000 persons
- Problems and issues of concern: Sanitation, cleanliness and proper waste disposal
- Which social groups affected: IITGN Community and neighbouring villages

MAIN FOCUS OF THE BEST PRACTICE

a) Eco-friendly Sewage treatment plant that provides recycled water and manure for horticulture on campus.

b) Waste segregation practice in housing and hostel areas and all campus eateries

c) Sanitary and e-waste management through specialized agencies

d) Bio-waste management through specialized agencies, composting pits & biogas plant on campus.

e) Recyclable waste management for paper, plastic and thermocol

f) Collection of expired/unused medicines

g) Cleanliness drives within and outside campus

h) Engagement in nearby villages for cleanliness and sanitation education and best practices.

i) Inclusion of cleanliness in curriculum through foundation program

j) Energy Efficiency & Passive Cooling

k) Water Management

l) Renewable Energy (Solar PV System)

ESTABLISHMENT OF PRIORITIES:

The foremost priority was establishing STP, which became operational from the first day of occupancy of the campus. Next was setting up of the compost pits and the biogas plant along with institution of a Green Office and waste segregation practices. The construction and commissioning part was done through the Institute Works Department (IWD) of IITGN. After successful implementation of first STP (0.6 MLD), we have commissioned second STP (0.6 MLD) in April 2022. Bhabha Atomic Research Centre (BARC) experts

were involved in development of the biogas plants. The responsibility of proper segregation and disposal of waste has been taken up by the entire IITGN community with the efforts being spearheaded by the Green Office – a body comprising of IITGN faculty members and staff.

MOBILISATION OF RESOURCES

The financial, technical and human resources involved in the development of the sewage treatment plant, the biogas plant and the compost pits were through the main funds of construction of the permanent campus of IITGN, i.e., they were part of the planning of the main campus and were hence, allocated within the same resources. Central Public Works Department (CPWD) was the project monitoring unit that helped IITGN establish these facilities. The IWD of IITGN is responsible for regular functioning and maintenance of these systems.

THE PROCESS

Sewage Treatment Plant (STP): Since IITGN undertook the first large scale use of Canna plants to establish its eco-friendly STP, the initial operations were very challenging. The problems were solved with collaborative efforts by engineers from IWD and CPWD. Since its commissioning, IWD has been closely monitoring its functioning along with the quality of the output recycled water.

Biogas plant: The biogas plant was initially designed for 1 MT capacity. However, its operations have seen several challenges, primarily in maintaining appropriate pH in the digester for proper production of gas. Over a period of time, the plant was established by the IWD (with help from BARC) and a dosage of about 300 kg per day along with periodic feeding of cow-dung slurry works best for the biogas plant. The IWD engineers have been engaged in regular monitoring and upkeep of the biogas plant.

Waste segregation practices: Adoption of waste segregation practices was one of the most challenging tasks primarily due to the fact that most of the residents were not properly following such practices before living at the IIT campus. The natural tendencies to produce mixed waste were very high and even though provision of separate bins was made for collection, not many residents were depositing the waste in segregated condition. This was tackled through the constitution of a Green Office within campus to initiate timely efforts to educate everyone regarding segregation practices. A system for collection of segregated waste at block-level was also instituted through which, a couple of housekeeping persons go to each housing block for collection of waste. An external consultant was approached for further help in this matter. Gradually, policies were formulated by the Green Office regarding proper segregation and disposal of waste, which are given along with the housing lease agreement to all potential residents. Waste segregation and collection guidelines were also established for all campus eateries and shops. These guidelines indicate how to segregate waste and provide information pertaining to non-use of disposable utensils, polybags, etc. For periodic boost of the morale and the general state of affairs, the Green Office keeps organizing events focused on promoting green practices. Very recently, the Environment Day and Swachhata Pakhwada were celebrated at IITGN through the Green Office. The Green Office does not confine itself within the premises of IITGN and extends its activities to the neighbouring villages. It conducts awareness programs in the nearby villages and promotes the practices for proper segregation and disposal of waste. The students of IITGN are also very actively engaged in such activities. As part of the Foundation Program, the first-year undergraduate students undertake a small area every year and do a cleanliness drive in the area.

RESULTS ACHIEVED

IITGN campus is a zero-discharge campus with all of its sewage being treated inside its eco-friendly sewage treatment plant (STP). The STP treats about 7.5 lakh litres of sewage everyday which gives 7 lakh litres of recycled water and manure for horticulture works within the campus. The practices for solid waste segregation and disposal have been gradually instituted in the community and indicate a significant change in the behaviour and the attitude of residents with respect to waste segregation. Involvement of students through the various social outreach activities of IITGN have been appreciated by the local community. Students actively participate in awareness missions and cleanliness drives throughout the local vicinity. The STP, biogas plant and compost pits produce organic manure which is readily utilized for horticulture works within campus and adds to the efforts of maintaining a green campus. Use of food waste from the mess for feeding of street animals in designated areas reinforces IITGN's core principle of inclusiveness. Furthermore, by producing usable recycled water through STP and electricity through biogas plant (average 6 kWh/ day), IITGN is able to generate resources and energy from waste. Every year IITGN is harvesting water in Jalmandaps which can supply to the entire campus for 15 to 20 days.

SUSTAINABILITY

Financial: Cost recovery takes place in the following indirect and direct forms: production of recycled water and manure from sewage treatment plant, production of electricity (average 6 kWh/day) and manure from biogas plant, nominal direct financial income through sale of recyclable waste.

Social and economic: Proper waste segregation and disposal have become a social norm at IITGN and includes all stakeholders: children, women and men.

Cultural: The behaviour pattern within IITGN has changed substantially and respect for proper segregation and disposal has arisen. The community appreciates the importance of these aspects much better now.

Environmental: Biogas plant produces electric energy (energy from waste) and sewage treatment plant produces recycled water for use in horticulture. Through proper segregation, the amount of landfill waste is substantially reduced. Biogas plant, sewage treatment plant and compost pits produce rich organic manure that is readily utilized within the campus. A system to absorb all of the manure has been put in place by the horticulture works. Solar PV generation on campus aids in saving electricity from the grid which in turn help in CO_2 emission reduction.

Institutional: A Green Office has been instituted within the campus which spearheads the efforts towards waste segregation and disposal. It has a mandate of educating, spreading awareness and overseeing the execution of initiatives related to waste management. The decision-making process is simple and efficient. The IWD remains in sync with the Green Office so that the intellectual and execution aspects of waste management can happen seamlessly.

TRANSFERABILITY

IITGN is a modern educational Institute with open boundaries where anyone and everyone is welcome to visit and learn about its practices. The IWD is primarily responsible for the upkeep and maintenance of the sewage treatment plant, biogas plant, and compost pits. The concerned officers are ready to engage with anyone who wishes to replicate the waste management practices. Additionally, with the intention of dissemination of the good practices, IITGN has published several booklets on thematic areas such as 'Planning the sustainable campus' which are available on its website (www.campus.iitgn.ac.in). Moreover, another publication on 'Water and wastewater management' has also been published which have more details pertaining to the sewage treatment plant. IITGN welcomes all efforts to learn from its good practices and those interested may directly write to the Dean, Campus Development at campus@iitgn.ac.in.

LESSONS LEARNED

IITGN is a modern institute with an open mind set and believes in the philosophy of inclusiveness. The same philosophy was at the base of the development of its permanent campus at Palaj, Gandhinagar. An all-inclusive philosophy meant that the campus was to be constructed with minimal impact on the environment. Consequently, the campus was planned to be a zero discharge and zero waste campus. For development of biogas plant, the expertise from BARC was utilized. Several working methodologies and processes were developed in-house to institute proper waste segregation, management and disposal practices within campus. The practices developed at IITGN are highly modular and can be readily extended to other establishments. In line with its existing sewage treatment plant, another one is being planned for the next phase of upcoming buildings within the campus. The practices and policies developed by the Green Office can also be leveraged by anyone willing to learn from them. Anyone interested in taking this forward can write to Dean, Campus Development (campus@iitgn.ac.in).

REFERENCES

Image: A view of the a project component

Image: A view of a project component

Image: A view of a project component, showing wider dissemination of the project

Image: Another view of the a project component

Image: A view of a project component

Image: Another view of project component

REFERENCES

LAST WORD

IIT honoured for holistic approach to sustainability

FPJ BUREAU / Gandhinagar

The Indian Institute of Technology Gandhinagar (IITGN) has won the International Green University Award 2023 by the Green Mentors, USA, a non-government organisation with special consultative status with the United Nations Economic and Social Council (ECOSOC), for its holistic approach to sustainable practices.

P K Chopra, registrar of IITGN, received the award on behalf of the IITGN at the 7th NYC Green School Conference held at Cornell University, USA, on the sidelines of the 78th United Nations General Assembly session in New York.

The conference brought together thought leaders, educators, learners, policymakers, innovators, diplomats, administrators, solution providers, bookkeepers, healthcare experts and climate leaders from around the world to discuss a wide range of topics related to fostering a more inclusive, compassionate, and climate-conscious approach toward humanising global education.

The International Green University Award acknowledges universities worldwide that have integrated sustainability into their core values, operations and academic programmes for community and student engagement, and have implemented sustainable practices such as energy-efficient infrastructure, renewable energy solutions, waste reduction and recycling programmes, and sustainable transportation initiatives.

The award recognises IITGN's remarkable efforts and outstanding achievements in promoting environmental sustainability and instilling eco-conscious values among students. The Institute fosters a sustainable learning environment with a range of environmental awareness and conservation initiatives, including plogging drives, training sessions for different stakeholders, passive shading and orientation design, extensive use of natural light, eco-friendly sewage treatment plants, rainwater harvesting systems, biogas and composting systems, solar panel installations, use of water-saving aerators in all washbasins and faucets, efficient waste management and implementation of e-office system to reduce usage of papers for official communication, among others.

Attributing this recognition at the global level to the dedicated efforts of the Institute community, Prof Rajat Moona, director, IITGN, said, "This award is a testament to the untiring passion, commitment and hard work of our campus development office and the entire IITGN community, which take pride and joy in living in harmony with the environment and fostering environmentally conscious lifestyle. This award has further strengthened our commitment to champion the cause of environment conservation and sustainability."

Image: A Newspaper clipping related to the project

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એનર્જી કન્ઝર્વેશન માટે IITGN અગ્રેસર, કેમ્પસ એનર્જી માટે ગ્રીન ફિચર્સ ધરાવે છે

સોલાર પેનલથી 6,80,793 kWh એનર્જી જનરેટ કરાઈ

ગાંધીનગરઃ દર વર્ષે 14 ડિસેમ્બરને 'નેશનલ એનર્જી કન્ઝર્વેશન ડે' તરીકે ઉજવવામાં આવે છે. જેનો ઉદ્દેશ એનર્જી કન્ઝર્વેશન વિશે અવેરનેસ ફેલાવવાનો છે. એનર્જી કન્ઝર્વેશન માટે ઈન્ડિયન ઈન્સ્ટિટ્યૂટ ઓફ ટેક્નોલોજી ગાંધીનગર ખાતે વર્ષોથી ઈનિશિએટિવ ચાલી રહ્યું છે. IITGN કેમ્પસમાં રૂફટોપ સોલાર પેનલ્સ અને વિશિષ્ટ સોલાર કાર્પોર્ટ લગાવવામાં આવ્યા છે. જે 500kWpની ક્ષમતા ધરાવે છે. એપ્રિલ 2022થી માર્ચ 2023 સુધી ઈન્સ્ટિટ્યૂટે 6,80,793 kWh સોલર એનર્જી જનરેટ કરી હતી. તે ઉપરાંત એનર્જી બચાવવા માટે કેમ્પસના હાઉસિંગ અને હોસ્ટેલમાં સોલાર વોટર હીટરનો પણ ઉપયોગ કરાય છે. જેનાથી વોટર હીટિંગ જરૂરિયાતો માટે વીજળીના વપરાશમાં ઘટાડો થાય છે. IITGN એ એનર્જી એફિશિયન્સી વધારવા માટે ગ્રીન ફિચર્સ ધરાવે છે. જેમ કે, પેસિવ શેડિંગ અને ઓરિએન્ટેશન ડિઝાઈન, નેચરલ લાઈટનો વ્યાપક ઉપયોગ, બિલ્ડિંગ પેરિફેરીમાં લોકલ પ્લાન્ટથી પણ ઠંડક વગેરે. ઈન્સ્ટિટ્યૂટની બિલ્ડિંગ પાવરનો વપરાશ ઘટાડવા માટે LED લાઈટ ફિક્સર અને મોશન સેન્સરની પણ સુવિધા કરાઈ છે. કેમ્પસના બિલ્ડિંગ એવી રીતે ડિઝાઈન કરવામાં આવી છે કે તે દિવસ દરમિયાન વધારે સૂર્યપ્રકાશ મેળવે છે જે ઈલેક્ટ્રિસિટીના ઉપયોગને ઘટાડે છે. તે ઉપરાંત ડાઈનિંગ હોલ માટે મિસ્ટ પંપનો ઉપયોગ કરીને પેસિવ ડાઉનડ્રાફ્ટ ઈવેપોરેટિવ કૂલિંગ ટેક્નિક અપનાવવામાં આવી છે. એનર્જી કન્ઝર્વેશન માટે IITGNને વિવિધ પ્રકારના એવોર્ડ્સ પણ મળ્યા છે. જેમ કે, ઈકો કેમ્પસ રેટિંગમાં નેચરલ ક્રેડિટલ એવોર્ડ્સ, આર્કિટેક્ચરમાં ક્રિએટિવિટીને પ્રોત્સાહિત કરવા માટે AESA એવોર્ડ્સ, ગ્રીન બિલ્ડિંગ માટે HUDCO ડિઝાઈન એવોર્ડ, સસ્ટેનેબલ પ્રેક્ટિસ માટે યુનાઈટેડ ઈકોનોમિક એન્ડ સોશ્યલ કાઉન્સિલ દ્વારા ગ્રીન યુનિવર્સિટી એવોર્ડ 2023 વગેરે.

Image: A Newspaper clipping related to the project

IITGNએ ઇન્ટરનેશનલ ગ્રીન યુનિવર્સિટી એવોર્ડ ૨૦૨૩ જીત્યો

આ એવોર્ડ પર્યાવરણીય સ્થિરતાને પ્રોત્સાહન આપવા અને વિદ્યાર્થીઓમાં પર્યાવરણ પ્રત્યે સભાન મૂલ્યો કેળવવામાં સંસ્થાનાના નોંધપાત્ર પ્રયાસોનું ફળ

ગાંધીનગર, તા. ૧૯

તેની ઉપલબ્ધીઓમાં વધુ એક પીંછું ઉમેરતા, ભારતીય પ્રૌદ્યોગિકી સંસ્થાન ગાંધીનગર (IITGN)એ ગ્રીન મેન્ટર્સ, યુએસએ દ્વારા ટકાઉ પ્રેક્ટિસ માટે તેના સર્વગ્રાહી અભિગમ માટે ઇન્ટરનેશનલ ગ્રીન યુનિવર્સિટી એવોર્ડ ૨૦૨૩ જીત્યો છે. ગ્રીન મેન્ટર્સ એ યુનાઇટેડ નેશન્સ ઇકોનોમિક એન્ડ સોશિયલ કાઉન્સિલ (ECOSOC) સાથે વિશેષ સલાહકાર દરજ્જો ધરાવતી બિન-સરકારી સંસ્થા છે.

IITGNને આ એવોર્ડ આ અઠવાડિયે ન્યુ યોર્ક સિટીમાં યોજાઈ રહેલી ૭૮મી

એકત્રાયે લાવ્યા છે.

ગ્રીન યુનિવર્સિટી એવોર્ડ વિશ્વભરની એવી યુનિવર્સિટીઓને માન્યતા આપે છે કે જેમણે સમુદાય અને વિદ્યાર્થીઓના જોડાણ માટે તેમના

પર્યાવરણીય જાગરૂકતા અને સંરક્ષણ પહેલની એવી સાથે ટકાઉ સિસ્ટમ વાતાવરણને પ્રોત્સાહન આપે છે જેમાં પ્યોગીંગ ડ્રાઈવ, વિવિધ શિબિરો માટે તાલીમ સત્રો, નિષ્ક્રિય કૂલિંગ અને

Page 1 / 1

Image: A Newspaper clipping related to the project

CONTACT INFORMATION

Title of the Best Practice	:	IIT Gandhinagar – Green Campus
The location of the Best Practice	:	Indian Institute of Technology Gandhinagar, Palaj, Gandhinagar – 382055 (Gujarat)
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Recycle and Reuse of Sewage Water for Industrial grade water supply through Tertiary Treatment Plant

Surat Municipal Corporation, Surat, Gujarat

BACKGROUND

Pandesara GIDC Industrial area; a major industrial cluster with water-based industries; is situated in southern part of Surat city. There are approximately 600 Industries in Pandesara area, out of which approximately 130 industries are water-based industries comprising of mainly textile processing units and chemical industries. These textile processing units cater almost 40% of total demand of synthetic yarn made sarees and dress materials of our entire country. They require huge quantity of soft water with continuous supply from reliable source for their process of manufacturing.

The Water demand of Pandesara industries is approximately 90 – 100 MLD, comprising about 80 – 85 MLD of process water requirement and 10-15 MLD of potable quality water demand. Of the total demand, nearly 55 MLD is met through SMC potable water supply. The remaining demand is met through private sources including bore wells and water tankers. Furthermore, the Industrial units do not require quality of water as pure as potable water for industrial use, hence considering the acceptable parameters for industrial grade water, SMC had decided to implement a project to supply industrial grade water by tertiary treatment of sewage from the Bamroli and Dindoli Sewage Treatment Plant (STP) to Pandesara Industrial Estate.

Thus, Surat Municipal Corporation has constructed total 80 MLD (40 + 40 MLD) capacity Tertiary Sewage Treatment Plant to treat secondary treated water from Bamroli and additional capacity of 40 MLD at Dindoli Sewage Treatment Plant in year 2021 to recycle, generate & supply Industrial Grade Water for Pandesara Industrial Estate. The capital cost of TTP plant at Dindoli was of Rs. 139.07 Crores. The plant was commissioned in March 2021 and is functional since then. This Tertiary sewage treatment plant being the very first of its kind in India at ULB level, Surat Municipal Corporation was again in limelight at the national stage again for its initiative in the new direction of technical excellence. This initiative is useful in water conservation and wastewater recycling and to free up potable water resources for non-potable purposes and this free up potable water is now being supplied as drinking water to the newly merged area in the Surat city.

In the year 1986, Surat City limit was extended and the whole Industrial area of Pandesara was covered under new city limit. These industries required huge quantity of soft water with continuous supply from reliable source for their process of manufacturing. Prior to 1998, Gujarat Industrial Development Corporation (G.I.D.C.) was providing Industrial water through their network for the duration of 6 to 8 hrs. only per day. The duration & quantity of water supply was insufficient for their requirement. Hence, in the year 1998 all the Industrial units of Pandesara formed an association and they requested Surat Municipal Corporation to provide water supply for industrial use.

This was an opportunity for Surat Municipal Corporation to earn good revenue from one source and use the same revenue for the benefits of citizens of Surat city to improve water supply infrastructure. Hence, Surat Municipal Corporation entered into an MOU (Memorandum of Understanding) with Pandesara Green Environment and Water Welfare Cooperative Society Ltd. in year 1998 to supply Industrial use water for 20/22 hrs. per day to all the member units of association. Based on the water demand of Pandesara Association S.M.C. constructed a water distribution Station and laid pipeline network for the Industrial area during the year 1998-99.

KEY DATES

DATES (days-month-year)	Significance/Achievement
31.03.2021	Commissioning of TTP

MAIN FOCUS OF THE BEST PRACTICE

a) Reuse & Recycling of wastewater: an environmentally sound & advance practice.

b) Conservation of valuable ground water resources for future generation.

c) Guaranteed revenue generation for Surat Municipal Corporation.

ESTABLISHMENT OF PRIORITIES

The solution to the problem depicted in the "Situation before the initiative" was derived by implementation of project of Tertiary treatment of secondary treated sewage and to recycle, generate and supply Industrial Grade Water to Pandesara Industrial Estate.

The Pandesara Industrial Estate is just 10 Km away from the Sewage Treatment Plant at Dindoli. Hence, SMC decided to set up an additional 40 MLD capacity Tertiary Treatment Plant to treat secondary treated water from Bamroli as well as Dindoli Sewage Treatment Plant to supply Industrial Grade Water to Pandesara Industrial Estate.

For the mutual benefit of SMC & Pandesara Industries, both the parties again executed MoU in year 2013-14 to supply blended (tertiary recycled & treated plus potable grade of water mix) water for the Industrial use and potable grade of water for Industrial Employees and workers etc.

MOBILISATION OF RESOURCES

Looking to the technical experience available with SMC, having experience of operating more than 1,655 MLD water and sewage treatment plants and the financial model which can generate revenue for SMC in long terms, SMC decided to take up the project by own funds and also operate the plant with own funds, whereas regular income from the industry emerged by selling tertiary treated water to industries on agreed terms. However, the structural and process design was vetted through technical and academic institutions in Surat. Third Party Inspection agency was also engaged for quality Control. The project was funded under SMART CITY MISSION of Government of India.

THE PROCESS

The Water demand of Pandesara industries is approximately 90–100 MLD, comprising about 80 – 85 MLD of process water requirement and 10-15 MLD of potable quality water demand. Of the total demand, nearly 55 MLD is met through SMC potable water supply. The remaining demand is met through private sources including bore wells and water tankers. Furthermore, the Industrial units do not require quality of water as pure as potable water for industrial use, hence considering the acceptable parameters for industrial grade water, SMC had set up a 40 MLD capacity Tertiary Treatment Plant to treat secondary treated water from Bamroli and 40 MLD at Dindoli Sewage Treatment Plant to supply Industrial Grade Water to Pandesara Industrial Estate.

Treated industrial grade water from the outlet of TTP is then supplied to existing underground storage reservoir of 450 Lakh liters capacity at Pandesara water distribution station. The stored water blended with potable grade of water mix with required parameters is then supplied to industries for non-potable use.

For this new system SMC has made some necessary changes in the existing pipeline network to cater to potable water supply of about 5-10 MLD for Industrial Employees and workers etc.

The Project:

Design, Build & Operate (for 10 years), 40 MLD capacity Tertiary Treatment Plant to treat secondary treated water from Dindoli Sewage Treatment Plant to generate Industrial Grade Water for Pandesara Industrial Estate, Surat.

The Project Features:

- Capital Project cost : Rs. 139.07 Crore
- Operation & Maintenance Cost for 10 Years : Rs. 98.26 Crore
- Project duration : 24 Months
- Capacity of Tertiary Treatment Plant : 40 MLD

- Project Completion Date : March 2021
- Total Recycle water Supply to Industries : 34,522.97 MLD till December 31, 2023
- Total Revenue Generated through supply of Industrial Grade Water : Rs. 125.04 Crore till December 31, 2023

Treatment Technology Used:

The following types of tertiary treatments are being used at Bamroli and Dindoli tertiary treatment plant to achieve the desired tertiary treated industrial grade water parameters.

- Sand Filtration
- Ultra-filtration
- Reverse Osmosis (RO)
- Activated Carbon Filtration (ACF)

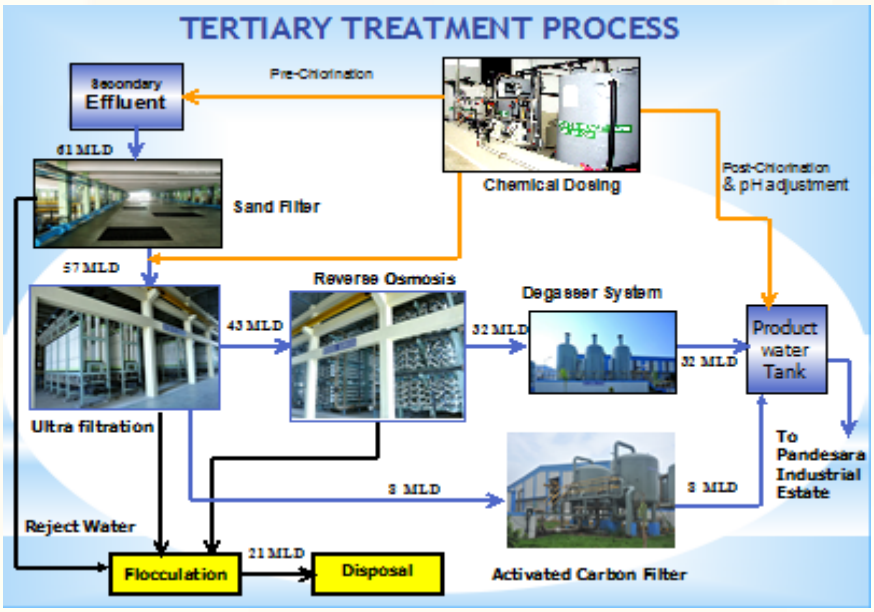

Image: Schematic diagram of the products, technologies and solutions deployed in the project

Scale and Coverage:

The project is envisaged to be implemented in a phased manner with an initial capacity of Tertiary Treatment Plant of 40 MLD with an option to scale up in a modular fashion to 80 MLD subject to growth in demand for Industrial process water, increase in output of Dindoli STP and progressive reduction in SMC water supply.

Recycled waste water & Potable water is supplied separately to Pandesra industrial Estate by dual piping system for industrial and for potable purpose.

SUSTAINABILITY

Operation & Maintenance of this project for 10 years is included in the tender along with its design & construction. All the consumables as well as spare-parts required for operation & maintenance of the plant are in scope of tender.

Technological outcome of the project is as per the design requirement. Social & Environmental outcome of the project is in favour of green environment due to recycle and reuse of sewage water after tertiary treatment. Economical outcome of the project is also positive as design pay-back period for the plant is only 7-8 years.

This Project is sustainable in terms of saving of conventional water, which is being utilised where it should be, and this project is for creation of new source which is environmentally sustainable as well as financial model is viable to get back the invested money within 8 years of payback. After completion of payback, there would be certain amount available, which could be utilised for other

infrastructure work.

The project design takes into consideration future demand of water and expansion to double plant capacity. All these points make this project economically, environmentally & socially self-sustainable.

TRANSFERABILTY

Post-initiative scenario is as per the desired objectives of the project. After the initial trial-run period of 3 months, now plant has been successful in delivering the desired quality and quantity of recycled & treated water supply for intended industrial reuse.

Revenue income from the water supply is also in line with the requirement. The rate of potable water is Rs.23/- per kl and the base rate of tertiary treated water was Rs.18.20/- per kl with indexation base rise every year. The weighted average rate is now being considered as per the actual consumption. Meter reading, checking, monitoring & surveillance activities are performed regularly departmentally. Computerized bills are generated and issued bi-monthly.

The purpose of tertiary treatment is to provide a final stage of sewage treatment so as to raise the effluent quality before it is discharged to the receiving environment (sea, river, lake, ground, industrial re-use etc.). More than one or in combination of several technologies, tertiary sewage treatment process may be used at any treatment plant to achieve the desired treated effluent parameters.

Industrial growth is the need of our nation today and by recycle & reuse of tertiary treated water will not only be able to boost the growth of water-based industries and thereby employment & GDP of our country but also contribute to maintain the green environment for future generations.

LESSONS LEARNED

The motivation behind this initiative was:

1) To conserve the conventional water resources and use it for domestic purpose.

2) Reduce the quality of treated water to be discharged in to nearby water bodies.

There are certain points which we learned from establishment of this plant which are discussed as below:

1. The quality and quantity of sewage reaching to STP should not have much variation/fluctuation, particularly there should not be any illegal discharge of industrial waste in to sewage and if it is found, it should be first addressed.
2. Inlet quantity to tertiary should be continues supply and for that the system of buffer tank is required.
3. There should be uninterruptible power supply to the plant for continuous functioning of the plant.
4. Operation & Maintenance of the plant (long term) should be with the agency who has set up the plant.
5. The proper treatment of rejected water after Tertiary Treatment shall be planned.
6. The secondary sewage treatment plant should be so operated that the outlet parameters of secondary treated water match with the acceptable inlet parameters of Tertiary Treatment Plant and for that comprehensive Operation & Maintenance up to Tertiary Treatment Plant should be given to single agency.
7. Staff training is must as on-site components like UF/RO are imported from other countries. So as to avoid dependency and inhouse capability should be developed.

REFERENCES

Sr. No.	Title of Article	Publication title	Date
1.	Smart City Award	Sandesh, Surat	26th August 2023
2.	India's Smart City Award-2022	Sandesh, Surat	8th October 2023

આગામી સપ્ટેમ્બર માસના અંતમાં ઈન્દોર ખાતે આયોજિત સેરેમનીમાં એવોર્ડ એનાયત થશે

સ્માર્ટ સિટી : સુરત સમગ્ર દેશમાં બીજા ક્રમે

પ્રોજેક્ટ અને ઈનોવેશન કેટેગરીમાં ત્રણ એવોર્ડ ઉપરાંત પાર્ટનર અને ઈન્ફ્રાસ્ટ્રક્ચર કેટેગરીમાં વધુ ત્રણ એવોર્ડ

Image: Newspaper Clipping, Sandesh, Surat; Dated: 26th August, 2023

સુરતની એન્વાયરો કન્ટ્રોલ પ્રાઈવેટ લીમીટેડને "ઈ-ન્ડીયન સ્માર્ટ સિટી એવોર્ડ-૨૦૨૨" એનાયત

ENVIRO CONTROL PVT LTD

Image: Newspaper Clipping, Sandesh, Surat; Dated: 8th October, 2023

CONTACT INFORMATION

Title of the Best Practice	:	Recycle and reuse of Sewage Water for Industrial grade water supply through Tertiary Treatment Plant
The location of the Best Practice	:	Moje; Dindoli, Plot No. 262,270,271, Surat- 394210, (Gujarat)
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Contact Person	:	Shri Ketan B. Desai, AdditionalCity Engineer
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Website	:	https://www.suratmunicipal.gov.in

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Quick Pass-Centralised digital pass issue system for septage collection, transportation, disposal and payment- Thiruvananthapuram Municipal Corporation

Thiruvananthapuram Municipal Corporation, Kerala

BACKGROUND

This e-Governance project has positively changed the life of hundreds of workers involved in septage collection and transportation and has prevented pollution of water bodies. The septage waste (black and grey water) which was illegally collected and disposed of non-scientifically in public places is now being scientifically collected, transported and treated with official monitoring. The project has re-engineered the processes and systems of Thiruvananthapuram Municipal Corporation and have transformed the thought processes of elected representatives, officials, public and service providers alike. The transformation of the entire machinery from a slow physical file-based system into a fast digital technology oriented one is astounding. The project is exemplary and unique in the sanse that stakeholders in various walks came together to solve a social issue using technology as the binding force.

Thiruvananthapuram Corporation is spread over 214.86 kilometre square with 100 wards and a population of approx. 10 lakh inhabitants. The city has a sewerage network 620 KM and 53,000 connections which ends at a 107 MLD capacity sewage treatment plant (STP) situated at Muttathara. The sewerage network coverage density of the city corporation is 6,000 person per km square, but in the core city area, the population density is in between 15,000-20,000 per person per kilometre square. There is a large gap between the coverage and the total population and this leads to situations where the public had to make use of private tanker service for disposal of septage. There were more than 50 private tankers, within the city, to carry out the activity and they charged very hefty rates for the service from the public. This septage is emptied, unauthorizedly, to water bodies and other public places like drain, storm water drain, paddy field etc which directly contaminated water bodies and in turn affected the health of the general public. In order to resolve the grievances of the public and to control the unauthorised emptying of wastewater (septage) in water bodies, Corporation of Thiruvananthapuram decided to implement this project.

The dumping of septage waste was a serious issue haunting Thiruvananthapuram polluting its water bodies and public places. Being home to quite a few rivers and lakes, the city is rich in water resources which are being actively used by the population for daily activities. The lack of systematic processes for collection of septage waste (black water) had caused the evolution of a parallel illegal network of trucks owned and operated by criminal elements who had no regard to effects of pollution or to the rules and regulation related to the same. This mafia was so strong that even elected representatives had a hard time dealing with them.

This project aimed at providing a central digital platform which can be used for regulating and monitoring the trucks and service providers who are collecting septage waste and to ensure scientific disposal of the collected waste. A bylaw was officially passed by the Corporation Council after much discussion and interactions which detailed the processes to be implemented in this regard. The septage waste treatment facility of the Corporation at Beemapally was upgraded to allow trucks to dump the waste easily. Two backup dumping locations (decanting stations) were also identified to be utilized in case of emergencies. The corporation empaneled the vendors who wanted to provide the service and based on the licensing conditions, they were required to make their trucks scientifically capable of storing and transporting septage waste. The trucks were fitted with IRNSS based AIS140 GPS devices and data was fed to corporation's servers in real-time. Inspections were done on the trucks which were aptly painted and licenses were issued to suitable ones. The licensing and related processes were done via a digital platform which could be accessed by the vendors and officials.

Once the vendors were empaneled, a digital booking portal was put up for allowing the public to request waste collection service. The portal was linked to the public mobile app for the corporation named Smart Trivandrum. The app acted as a hub which provided a public platform for the users who needed the service. The payment related to the service was totally digital and was collected using

multiple payment gateways. A call centre which operates 24 X 7 was also set up which had trained officers who would receive calls from both public and service providers and sort out any issues which they faced. The call centre has necessary man power, hardware and software to handle multiple calls concurrently. The booking portal also had a full swing administration area which could be accessed by the call centre and officials. All information about the trucks, bookings and service delivery was presented to the users by the system in an informative way for effective decision making. The GPS data was presented in map interface for real time monitoring and automated systems were put in place to monitor the data and to find out if any malpractices are made. The system uses a scheduling algorithm and allocates each booking to a truck based on its priority. The algorithm is designed to adjust the allocation so that all drivers get bookings evenly.

The service providers were given a mobile app which alerted them about any new bookings allocated to them and provided a digital pass for moving the waste. The QR code-based pass can be scanned and information about the truck can be seen by officials. Once the truck reaches the plant, the operator at the plant will scan the QR code and takes a photo of the truck as proof of service completion. The plant and decanting stations are also fitted with ANPR cameras which are integrated with the system. So, whenever a truck arrives at the plant, the system will get the information. Once service is completed, the service charge will be transferred to the service providers account digitally without any physical file movements.

The system was very successful and public opinion was positive. The corporation's own trucks were also linked to the system there by making it a total solution for septage waste movement. The truckdrivers and workers were given regular training on scientific waste movement and precautions to be taken. Necessary gears and uniforms were supplied to them regularly. This capacity building exercise has empowered the service providers and presently they have taken more responsibility towards waste movement without causing pollution. This social reformation brought about by the digital system has put in place a permanent framework for eliminating the serious issue of pollution of water bodies with septage waste.

The service delivery time-line and quality has improved many folds since the implementation of the project. It took days or weeks for the end user to get the service earlier and presently it takes only hours. The operations which took place only at night mainly due to the illegal nature of the service was shifted to day time fully since the system was in place. Also the end users are provided with real time information on what is happening on their booking via the Smart Trivandrum mobile app. The details of the vehicle and driver who is assigned to execute the work, the time-line of each activity and other relevant information is available at the fingertips of the user. Moreover, the citizens had no way to complain against issues in quality or other aspects or service earlier. Now they can contact the call centre or post their complaints via the online grievance redressal system which will be monitored and rectified on time.

Software for centralised coordination: The key component of the architecture of the system was the central software which acted as the command and coordination centre connecting all the stakeholders to a single point. This acted as the brain of the system and allowed data transfer between various other connected systems.

Mobile app for drivers: The truck drivers were given an android mobile application which they can install in their own phone. The communication between the central system and drivers happens via this app.

Public app for end user: The general public were provided with a mobile application which can be used to book the service. The status of the booking was available to them in real time via this app. Thus the central system could communicate with the end users via this app.

Septage Call Centre Service: The call centre was equipped with hardware and software for high call volumes. It could receive concurrent calls from multiple lines via a software component which was further integrated with the central system. Thus the call centre executive could see the relevant information related to the caller like current and past orders, tickets etc on the screen when a call came in. A mobile number 9496434488 , A landline number 0471 2377701 and a septage central complaint number 14420 are attached to this call centre.

IRNSS based GPS Integration: The trucks were fitted with AIS 140 GPS/IRNSS devices which were directly integrated to the central system via HTTP protocol. The device fed the data in predefined format which allowed the system to determine the realtime location of the truck.

Geofencing of plant : The treatment plant and the decanting stations were geotagged and the GIS information was fed to the central system. Based on this data and the data from the GPS device fitted in the truck, the system could monitor and identify when a truck arrives at a decanting station.

ANPR Camera integration: The plant was fitted with automatic number plate recognition cameras and was integrated with the central software. The ANPR system identified the number of any vehicle which came to the plant and fed the data to the central system. This information was used to identify the trucks which arrived at the plant

Service Delivery Channels: The following channels are used to book septage from the public:

- **Public mobile app for end users:** The general public were provided with a mobile application which can be used to book the service. The status of the booking was available to them in real time via this app. Thus the central system could communicate with the end users via this app.
- **Web Portal for Public:** The general public were provided with a web portal which can be used to book the service. The status of the booking was available to them in real time via this website . Thus the central system could communicate with the end users via this system.
- **Call Centre, Akshaya centre and Direct Booking Centre:** The call centre was equipped with hardware and software for high call volumes. It could receive concurrent calls from multiple lines via a software component which was further integrated with the central system. Thus, the call centre executive could see the relevant information related to the caller like current and past orders, tickets etc on the screen when a call came in.Also they support and help for direct booking service.

  The system houses various mechanism to ensure inclusion of all classes of citizens as follows:

  ⇒ Online booking and digital payment for anyone who has access to Internet and online banking.

  ⇒ Akshaya centre-based booking for anyone who do not have internet access but has online banking.

  ⇒ Bank challan-based cash payment option for anyone who do not have online banking.

  ⇒ Free booking option for officers for citizens who are financially backward.

  ⇒ Special subsidy for BPL citizens who are eligible.

Objective of the project

- To legalise the septage collection , transportation and processing system in Trivandrum Municipal Corporation.
- To prevent dumping of septage waste collected from households in public places and water bodies.
- To regulate the pricing structure of septage collection service and prevent exploitation of the general public by truck operators.
- To improve the standard of living of people involved in septage collection service and to help them earn a livelihood via legal means.
- To replace the manual system with a digital platform making it easier for the general public to use and to ensure that service delivery is done on time with proper quality.
- To make the entire operations fully transparent and implement necessary monitoring mechanisms to supervise the operation of the system.

KEY DATES

DATE(S)	Significance/Achievement
2018	Septage Management Bylaw approved from Council
1-Jan-2019	Vehicle Licencing Process Started
18-April- 2019	Software Based Quick Pass System Implemented and open for public booking
13-May-2020	10,000 Septage Trips Completed
29-Nov-2021	Quick Pass System recognized under the Azadi Ki Amrut Mahostav : 75 Digital transformation Stories
27-Dec-2022	50,000 Septage Trips Completed

FINANCIAL PROFILE

Organisation	FY: 2019-20	FY: 2020-21	FY: 2021-22	FY: 2022-23
Septage Vehicle Owners Vehicle Service Charge (Rs)	1,78,91,745	2,79,41,866	4,06,74,007	6,46,00,000
Corporation's Revenue-For Operation and Maintenance of System and Sewerage Treatment Plant (Rs)	79,91,732	1,02,04,891	1,59,54,209	2,23,00,000

ESTABLISHMENT OF PRIORITIES

The main priority of the corporation was to prevent contamination of water bodies due to dumping of septage waste. The regulatory mechanism and execution system was constituted based on a bye law which the council of corporation had passed. A software was developed and a team of health officials was setup to operate the system. The full process from empanelment of vehicles to distribution of payments to tankers was done with digital support. The software system formed the operating machinery and made decisions based on the provisions in the bylaw. The officers worked as part of the digital system which eliminated any manual intervention from any level as they did not have any decision-making powers. Training was given to drivers, officers and plant operators to familiarise them with the software and mobile apps. They were taught how to access the relevant information they need to operate on a daily basis. A 24/7 call centre was set up by the corporation to monitor the operations and to resolve any grievances from the public, drivers, plant operators or officers.

MOBILISATION OF RESOURCES

Corporation utilised its own funds to develop the software systems and to purchase necessary hardware for operations. Once the operations began, the service charge collected by the corporation for each trip was used for operation and maintenance activities of the system. Since the revenue obtained as service charge is much more than the operating expenses, the system is fully sustainable and currently there is surplus funds in the project account.

- Nodal Officer - A Health Supervisor is given the charge.
- 25/7 call centre - Operated by corporation using its own staff.
- Transoft Solutions - Software vendor (Startup firm developed the system and to provide technical support).
- Federal Bank - Providing banking services for the system.
- Drivers and Owners - Operates the trucks and provides services to the public.
- Septage plant operators - Verifies that each trip has reached the plant and confirms dumping of septage in the plant.

PROCESS

One of the main hurdles we faced initially was the resistance from truck drivers to fall in line with the guidelines issued by the corporation. Regular training and communication were done with the group to ensure that they understood the importance of each direction. They used to collect cash from the customer initially as part of a habit that they had. Information was given to the customers not to provide any cash to the truck drivers for the service. This was communicated via SMS and also via the Smart Thiruvananthaturam mobile app. Once the service was completed, they were also asked to give feedback about the quality and to raise any grievance. This way the corporation was able to identify any problems which the customers faced. The processes and systems were tuned to prevent such problems and customer experience have improved a lot since the launch. The resistance from the public to resort to online and digital payment mechanisms were another challenge. There were certain class of people who were not tech savvy and did not have any digital payment mechanisms or who choose not to do any digital payments. Corporation setup a help desk to help such customers to move to digital payments and to use online payment gateways with debit cards or net banking. This initial problem was solved very easily after COVID- 19 lockdown when digital payments became popular.

RESULTS ACHIEVED

The impact of the system can be clearly seen in the drastic decrease in the number of complaints that the corporation receives regarding illegal septage dumping. The main objective of the system has been met various agencies and the Govt of Kerala has recognized the corporation for the exemplary intervention it did in this problem domain. The system is popular among the citizens and the businesses as it provides them with an economically viable option to dispose of septage waste. The rehabilitation of the staff

who operated the illegal services is another impact that the system had. All such staff who worked throughout night time fearing police and authorities were given an opportunity to work with dignity using state of the art equipment and systems. The following table shows the number of trips and the quantity of septage processed by the system in the last few years.

Year	No of Septage Trips Transported	Total Quantity Septage Processed (Litre)
2019	4813	2,14,70,624
2020	11,157	4,56,30,128
2021	14,124	6,14,00,100
2022	20,024	9,25,43,852

SUSTAINABILITY

The system operates on funds which it generates itself via the service charge collected per trip from the public. As the operating costs are less than the total revenue and as it does not depend on any outside funds to operate, the system is economically sustainable. The truck operators were charging hefty rates to the tune of 15,000 Rs for the service before introduction of the system from the public. As there was no alternative, they had to succumb to the pressure put on by the truck operators to obtain the service. They made sure that the customer was put in pressure by delaying the service. Now the rates are pre-published and customers can book for service online and make payment directly to the corporation via online modes. The rates are less than 5,000 Rs for a normal household which is far less than what they had to pay earlier. Since there is no cash transaction between operators and customers there is no friction in the field. Since the public perceives the system as a boon to them and recognizes its value, it is socially sustainable. The corporation was struggling with the problem of contamination of water bodies and roads due to unauthorised dumping of septage waste. There were regular complaints regarding such events and public health was being affected. Enforcement squads of the corporation had to spend lots of man hours patrolling the city at night time to detect and book violators. Since implementation of the system, the general public became aware of the benefits of using this service and thereby any player outside the network who illegally operated stopped getting any order. Also, the system is backed up legally using a bye law which the corporations council has passed. So, the system is institutionally sustainable as the top officials and political administrative heads are seeing the benefits of the system. The primary objective of the system is to prevent pollution of water bodies and based on the data we have; it is clear that it has met the objective clearly. They generate and ensure that it is getting dumped in the STP plant only. So culturally and environmentally the system is sustainable and has empowered the people to act up on a huge environmental problem.

TRANSFERABILITY

The system is handling the septage collection and disposal service perfectly in the corporation and all scenarios which arose during its operation have been handled easily. The system can be replicated to any corporation or municipality which is facing challenges similar to that of Thiruvananthaturam. Govt. of Kerala has identified the project as having a major impact on solving the septage problem and has mooted a proposal to replicate the system all over Kerala as part of Swachh Bharat Mission 2.0.

LESSONS LEARNED

The primary motivation behind the implementation of the system is the responsibility that the corporation has related to public health. As per the constitution of India, the local bodies are entrusted with the responsibility of providing clean drinking water and to manage the waste generated by the community. The corporation took its role very seriously and was having various discussions and consultations with experts from various domains to prevent the issue of dumping of septage waste in water bodies. We traced certain public health issues in certain areas in the corporation to the contaminated water sources in those areas. So, it was of paramount importance to the corporation to find a solution to the problem. The corporation's health team was experienced in implementing IT systems for the cleaning of Karamana river in Thiruvananthaturam. Also, the need for a legal backing for the entire process was identified initially. The formulation of the bye law which contained provisions for implementing the system based on an IT back bone was done for this. The identification of key lorry owners and union heads and earning the trust of such key people was of paramount importance in the success of the system. Instead of an iron fist policy, the corporation took an inclusive approach and educated the public and operators regarding the dangers of dumping septage in public places. Once all key players were on board, the system was operated in a distributed manner whereby no one had absolute control over any aspects. Thus, unnecessary interventions which can possibly derail the system were prevented. The main advice we have for any other institution implementing the system is to ensure that the entire operations have legal footing.

REFERENCES

Web-Link: https://negd.gov.in/sites/default/files/75%20DI%20Success%20Stories%20LATEST_L_0.pdf

Image: Transport vehicle used in the project

Septage collection: trial run of e-booking today

THIRUVANANTHAPURAM

Septage collection: trial run of e-booking today

STAFF REPORTER

7 vehicles register with Corporation

The trial run of the city Corporation's online booking facility for septage waste collection will begin on Thursday. The facility has been set up as per the local body's new bylaw, which was formulated to prevent the dumping of septage waste by private septage collection vehicles in public places and waterbodies.

The Corporation has introduced a licence system for private vehicles as part of this. Till now, seven vehicles have registered with the local body.

The GPS-enabled vehicles licensed by the Corporation are painted in dark brown and will have 'septage collection vehicle' marked in white.

Image: A Newspaper Clipping reporting about the project; The Hindu, April 18, 2019

Corp's septage waste collection system gets national recognition

As per reports, project helped hundreds of septage workers and controlled water pollution

EXPRESS NEWS SERVICE

Project status

Image: Another Newspaper Clipping reporting about the project

CONTACT INFORMATION

Title of the Best Practice	:	Quick Pass-Centralised digital pass issue system for septage collection, transportation, disposal and payment
The location of the Best Practice	:	Thiruvananthapuram Municipal Corporation Area; Thiruvananthapuram PIN-695 033 (Kerala) Kerala.
Name of the Winner (Name of the Applicant Institution)	:	Thiruvananthapuram Municipal Corporation
Address	:	Thiruvananthapuram Municipal Corporation Area; Thiruvananthapuram PIN-695 033 (Kerala) Kerala.
Contact Person	:	Binu Francis
Phone / Fax No.	:	Phone: + 91 9447303769
Email	:	tvpmcorpn@gmail.com
Website	:	https://tmc.lsgkerala.gov.in

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Preserving Old Historical Heritage Temple, School and other Buildings

Jaipur Smart City Limited, Rajasthan

BACKGROUND

Jaipur became the first city in the Rajasthan to be inscribed as UNESCO's 'World Heritage City' in 2019, owing to the rich heritage imbibed in its traditional architecture and unicity. The walled city of Jaipur is a heavy densely populated area in which many heritage Hawelies, schools, temples etc. are there. Over the time, these Hawelies, schools and temples have been impacted by decaying infrastructure, deteriorating structures, due to weathering effect and disintegration of buildings.This has resulted in diminished quality-of-life, diminished 'community pride' and diminishing interest in conservation and maintenance of the beautiful structures in the public areas. This project has been taken up with the aims to increase awareness and reinstate the community pride and interest in the collective heritage. The project, carried out in support of Jaipur smart city limited (JSCL) is to become in this project for improving and conservation of temples and schools.

Smart city mission was launched on 25th June 2015. The vision was to make the Indian cities smart. In this direction the Special Purpose Vehicle (SPV) named Jaipur smart City Limited was formed on 12th March 2016, a nodal agency to take up works proposed under the smart city proposal. Jaipur being a heritage city, the idea was also to restore its heritage, so that it can be cherished by residents of Jaipur as well as can be seen and explored by travellers who specially visit Jaipur for its architectural beauty and rich culture.

Jaipur gets its name from its founder Maharaja Jai Singh II (1693-1744) the great warrior and astronomer. He came to power at the age of 11 on the death of his father Maharaja Bishan Singh. The maharaja was told that his son would achieve greatness and he set out to ensure that Jai Singh Had a good education. He was trained by the best teachers and scholars in art, science, philosophy and military affairs. After the decline of Mughal empire upon death of Emperor Aurangzeb in 1707, after the dust had settled, peace reigned and the kingdom prospered and its borders expanded.

Jaipur Smart City Limited (JSCL) has carried out many projects undertaking architectural conservation and restoration of several heritage buildings such as Old Historical Heritage Temple, School and other Buildings. Some of the highlights of these initiatives have been described below:

1. **Temples:**
    a) Gopinath Ji temple, Chand pole bazar.
    b) Laxminarayan ji temple, badichaupar.
    c) Brij Nidhi temple, tripoliya bazar.
    d) Tadkeshwarmahadev temple, chaura Rasta.
    e) Kalki Ji temple badichaupar.
    f) Radha krishan ji temple chaugan chowk.
2. **Schools-**
    a) Govt. school Moti Katla.
    b) Govt. school Gangouri Bazar.
    c) Govt. school Manak chowk.
    d) Govt. school Kamla Nehru.
    e) Govt. school modikhana.
    f) Govt. Girls School kishanpole.

g) Govt. school Chaura Rasta.

h) Govt. school telipera.

3. Others Heritage Buildings

a) Maharaja school of arts, Kishanpole

b) Govt. Maharaja Library, Chaura Rasta

1. Temples

a. Gopinath Ji Temple Chand-pole Bazar: The History was enriched with a Golden Page When Thakur Shri Radha-Gopinath ji Maharaja Enshrined in The Present Mandir Shri Gopinathji, Jaipur at Purani Basti; and extended His Divine Blessing Hand to the wellbeing of this world class heritage city, the Pink City of India. The Great Founder of the MadhviyaGauria Sampradaya, 1008 Shri Chaitanya Dev Mahaprabhu is believed to be the spiritual incarnation of Lord Shri Krishna Himself and thereby goes the saying. He had a unique white golden complexion and, therefore, gained the name of "Gaurang Deva". "Gaur" was his popular name. Revitalisation & Conservation of Gopinath Ji Temple showing below with the help of Photographs.

Image: Gopinath Ji Temple- Restoration of temple with aim to preserve its historical integrity while enhancing their structural stability and aesthetic appeal by repairing intricate carvings and restoring frescoes

b. Laxminarayan Ji Temple Badi Chaupar :-

A very famous and ancient temple of lord Vishnu and goddess Laxmi. The idol has a unique feature, it is one idol only which is divided into two forms. Outside it, there is a small temple of Garuda, who is the vehicle of lord Vishnu. The internal architecture of temple is also marvellous and it attracts the trendy crowd and tourists also. Revitalisation of Laxminarayan Ji Temple showing below with the help of Photograph.

Image: Laxminarayan Ji Temple- Restoration of art work- Cleaning and restoring frescoes and carvings to preserve the temples artistic heritage

c. Brij Nidhi temple tripoliya bazar: -

Brijnidhi or Brajnidhi Temple in Jaipur dates back to 1792 AD and is a Krishna temple in Jaipur. It was built by Maharaja Sawai Pratap Singh, the grandson of Maharajah Sawai Jai Singh II, founder of Jaipur city. Revitalisation & Conservation of Brij Nidhi temple showing below with the help of Photographs.

Image: Brij Nidhi Temple- Structural integrity- Repairs to insure the temples foundation & walls are stable and secure preventing further deterioration

Image: Brij Nidhi Temple- Artistic restoration- Cleaning and restoring intricate carvings, frescoes and decorative elements to bring back their original vibrancy

d. Tadkeshwar Mahadev temple Chaura Rasta: -It is a popular temple of the Lord Shiva in the Jaipur city in the state of Rajasthan, India. This temple is located on a green hill in the Choura Rasta, area of Jaipur. It is a popular temple of the Lord Shiva.Tarkeshwar Mahadev Temple in Jaipur is a timeless gem, boasting a rich history spanning two centuries. The spiritual ambiance and architectural beauty make it a must-visit destination for Lord Shiva devotees and history enthusiasts alike. Revitalisation & Conservation of Tadkeshwar Mahadev Temple showing below with the help of Photographs.

Image: Tadkeshwar Mahadev Temple- Restoration of temple with aim to preserve its historical integrity while enhancing their structural stability and aesthetic appeal by repairing intricate carvings and restoring frescoes

Image: Tadkeshwar Mahadev Temple- Restoration of temple with aim to preserve its historical integrity while enhancing their structural stability and aesthetic appeal by repairing intricate carvings and restoring frescoes

e. Kalki Ji temple Badi Chaupar: -

Kalki Mandir is a Hindu temple in Jaipur, Rajasthan, India, which was built by Jai Singh II in the 18th century. The temple is located in SirehDeori Bazar opposite the palace gate. In the temple yard is a statue of a horse made of white marble. The temple contains statues of Kalki and Lakshmi. Kalki Temple in Jaipur is one of the best-kept secrets of the pink city. Revitalisation of Kalki Ji temple showing below with the help of Photographs.

Image: Kalki Ji Temple- Restoring intricate sculptures and carvings that may have deteriorated over time, using traditional techniques to maintain authenticity

f. Radha Krishan Ji Temple chaugan chowk:-

Radha krishan ji Temple is originally believed to be established by King Vajranabh (great-grandson of Krishna) around 5000 years ago. The temple is said to be in ruins; the icons were rediscovered by Narayan Bhatt (a disciple of Chaitanya Mahaprabhu) and a temple was built in 1675 AD by Raja Bir Singh Deo. Later, the present structure of temple was built by Narayan Bhatt with the help of Raja Todarmal, one of the governors in the Akbar's court.

Shreeji Temple, with its arches, pillars and red sandstone, looks like a structure dating back to the Mughal era. This popular temple in Barsana is a classic example of the Rajput architectur prevailing during that time. The temple looks like a magnificent palace which is made up of red sandstone and adorned with intricate hand carvings, beautiful arches, domes and exquisite paintings on its inner walls and ceilings. Red and white stones have been used for the construction of the temple, which are considered to symbolize the love of Radha and Krishna. Revitalisation of Radha Krishan Ji Temple showing below with the help of Photographs.

Image: Radha Krishan Ji Temple- Initiative focused on preserving its architectural heritage and spiritual significance

2. Schools.-

a) Govt. Girls School Moti Katla: -

GOVT GIRLS SCHOOL MOTI KATLA was established in 1945 and it is managed by the Department of Education. It is located in urban area. It is located in east block of Jaipur district, Rajasthan. The school consists of grades from 1 to 8. It is a girl's school and it doesn't have an attached pre-primary section. The school is non-Ashram type (Govt.) in nature and is not using school building as a shift-school. Hindi is the medium of instructions in this school. In this school academic session starts in April. The school has rent free building. It has got 13 classrooms for instructional purposes. All the classrooms are in good condition. It has 2 other rooms for non-teaching activities. Revitalisation of Moti Katla School showing below with the help of Photographs.

Image: Moti Katla School- Comprehensive approach to restoring and enhancing the educational environment while preserving its historical and architectural significance

b) Govt. Gangouri Bazar School

GOVT. ADARSH GIRLS SR. SEC. GANGOURI was established in 1951 and it is managed by the Department of Education. It is located in urban area. It is located in west block of Jaipur district, Rajasthan. The school consists of grades from 6 to 12. It is a girl's school and it doesn't have an attached pre-primary section. The school is Not Applicable in nature and is not using school building as a shift-school. Hindi is the medium of instructions in this school. In this school academic session starts in April. The school has rent free building. The source of Drinking Water in the school is Tap Water and it is functional. The school has a library and has 10908 books in its library. The school has 20 computers for teaching and learning purposes and all are functional. Revitalisation of Gangouri Bazar School showing below with the help of Photograph.

Image: Gangouri Bazar School- Restoring original architectural elements using traditional materials and techniques

c. Govt. School Manak Chowk: -

GOVT. SCHOOL MANAK CHOWK was established in 1844 by Sawai Ram Singh as "Maharaja School", and it was located at Manak Chowk, close to Hawamahal. It is all boys school and it does not have an attached pre-primary section. It is a very old heritage building which exhibits the typical Jaipur Architecture and Heritage shade. Education was mainly imparted in Hindi, Persian, English, Sanskrit, and Urdu to various students. Revitalisation of Manak Chowk School showing below with the help of Photographs.

Image: Manak Chowk School- Restoring original architectural elements using traditional materials and techniques

d. Govt. Kamla Nehru Sr. Sec. School: -

GOVT. KAMLA NEHRU SR. SEC. SCHOOL was established in 1956 and it is managed by the Department of Education. It is located in urban area. It is located in east block of Jaipur district, Rajasthan. The school consists of Grades from 6 to 12. It is a girl's school and it doesn't have an attached pre-primary section. The school is non-Ashram type (Govt.) in nature and is not using school building as a shift-school. Hindi is the medium of instructions in this school. In this school academic session starts in April. The school has rented building. Revitalisation of Kamla Nehru Sr. Sec. School showing below with the help of Photograph.

Image: Kamla Nehru School- Restoring intricate carving and architectural elements to maintain authenticity

e. Govt. School Modi Khana: -

GOVT. SCHOOL MODI KHANA was established in 1948 and it is managed by the Department of Education. It is in Urban area. It is located in west block of Jaipur district, Rajasthan. The school consists of Grades from 1 to 10. The school is Co-educational and it doesn't have an attached pre-primary section. The school is non-Ashram type (Govt.) in nature and is not using school building as a shift-school. Hindi is the medium of instructions in this school. In this school academic session starts in April. The school has Government building. It has got 5 classrooms for instructional purposes. All the classrooms are in good condition. It has 2 other rooms for non-teaching activities. Revitalisation of Modi Khana School showing below with the help of Photographs.

Image: Modi Khana School- Restoring intricate carving and architectural elements to maintain authenticity

f. Govt. Girls School Kishanpole: -

GOVT. GIRLS SCHOOL KISHANPOLE was established in 1930 and it is managed by the Department of Education. It is located in Urban area. It is located in west block of Jaipur district, Rajasthan. The school consists of Grades from 1 to 12. The school is Girls and it doesn't have an attached pre-primary section. The school is non-Ashram type (Govt.) in nature and is not using school building as a shift-school. Hindi is the medium of instructions in this school. In this school academic session starts in April. The school has Government building. All the classrooms are in good condition. It has 2 other rooms for non-teaching activities. Revitalisation of Kishanpole School showing below with the help of Photograph.

Image: Kishanpole School- Restoring intricate carving and architectural elements to maintain authenticity

g. Govt Girls Sr. Sec. School Chaura Rasta: -

GOVT. GIRLS SR. SEC. SCHOOL CHAURA RASTA was established in 1967 and it is managed by the Department of Education. It is located in Urban area. It is located in east block of Jaipur district, Rajasthan. The school consists of Grades from 1 to 12. The school is Co-educational and it doesn't have an attached pre-primary section. The school is non-Ashram type (Govt.) in nature and is not using school building as a shift-school. Revitalisation of Chaura Rasta School showing below with the help of Photograph.

Image: Sen Sec. School Chaura Rasta- Restoring intricate carving and architectural elements to maintain authenticity

h. Govt. Girls Sr. Sec. School Telipera: -

GOVT. GIRLS SR. SEC. SCHOOL TELIPERA was established in 1995 and it is managed by the Department of Education. It is located in urban area. It is located in east block of Jaipur district, Rajasthan. The school consists of Grades from 1 to 12. The school is Co-educational and it doesn't have an attached pre-primary section. The school is non-Ashram type (Govt.) in nature and is not using school building as a shift-school. Hindi is the medium of instructions in this school. In this school academic session starts in April. The school has Government building. It has got 6 classrooms for instructional purposes. All the classrooms are in good condition. It has 2 other rooms for non-teaching activities. Revitalisation of Telipera School showing below with the help of Photograph.

Image: Sen Sec. School Telipera- Restoring intricate carving and architectural elements to maintain authenticity

3. Others Buildings: -

a. MAHARAJA SCHOOL OF ARTS: -

Maharaja Sawai Ram Singh II, a ruler of the erstwhile princely state of Jaipur was lover and patron of Art. The School was started in 1857 A.D., initially with the name "Madarsa-e-Hunari", i.e. The Institute of Arts. In course of time, the institute became a pioneer in the field of art with as many as forty different disciplines of art and craft on its curriculum. Eventually it came to be known as "Maharaja School of Arts and Crafts" in 1886 A.D. The present institution, "Rajasthan School of Art" is the successor of the above-mentioned institute which has now acquired a renowned place in the teaching and learning of Visual Arts. Revitalisation of Maharaja School of Arts showing below with the help of Photographs.

Image: Maharaja School of Arts- Restoration of school with aim to preserve its historical integrity while enhancing their structural stability and aesthetic appeal by repairing intricate carvings and restoring frescoes

b. GOVT. MAHARAJA LIBRARY: -

Maharaja Library is situated in Chaura Rasta Jaipur, which is one of the busiest markets of Jaipur. This is developed as a place of daily newspaper, literally material and historical gazettes. Since federal times, rulers of Amber and Jaipur are found of regarding and writing books. In order to satisfy their need, they created a separate department which was popularly known as Pothi Khana in which government officials, courtiers and Kamdars used to take books for study and for official use.Lalit Kishore Ji temple was built in 1852 at corner of Chaura Rasta. In front of this temple, 10 big halls in an area of 6455 Sq. Ft. were built which were converted into public library in year 1886 by the then rulers of Jaipur Shri Ram Singh. The library has now been digitalized by Jaipur Smart City Ltd. JSCL had conserve all the rare books/manuscripts that are also available online which can be excessed by anybody. Revitalisation of Maharaja Library of Arts showing below with the help of Photographs.

Image: Maharaja Library- Comprehensive approach to restoring and enhancing the educational environment while preserving its historical and architectural significance

MAIN FOCUS OF THE BEST PRACTICE

a. Preserving old Historical Heritage Temple, School and other Buildings.

b. Improvement of Tourism/ Promotes Cultural and Tourism.

c. Increasing Foot falling and retaining our identity Heritage or Increase in Property

The work of renovation & beautification of buildings, schools and temples of Jaipur city has been completed by Jaipur Smart City limited in 2023 and has been transferred to the concerning institutions. Presently the said buildings, schools and temples are being used by the local public.

KEY DATES

S. No	Projects	Significance/Achievement (Completion Dates)
Government department buildings		
1	Rajasthan School of Arts, Kishanpole bazar	01.10.2018
2	Maharaja Library at Choura Rasta , Jaipur.	14.09.2022
Schools		
1	Govt. Sr. Secondary School, Moti Katla, Subhash Chowk, Jaipur	30.11.2022
2	Govt. Adarsh Girls Senior Secondary School, Gangauri Bazar Jaipur	31.12.2022
3	Govt. Sr. Secondary School, Manak Chowk Jaipur	31.12.2022
4	Govt. Girls Sr. Secondary Kamla Nehru School, Johri Bazar, Jaipur	31.12.2022
5	Rajkiya Secondary School, Modikhana Jaipur	31.12.2022
6	Maharaja Balika Senior Secondary School, Kishanpole Jaipur	31.12.2022
7	Govt. Girls Higher Secondary School, Chaura Rasta Jaipur	31.12.2022
8	Govt. Girls Sr. Secondary School, Telipara, Jaipur	31.12.2022
Temples		
1	Gopi Nath Ji Mandir, Purani Basti ,Jaipur	31.08.2022

2	Mandir Shri Ladli Ji (Laxminarayan Ji) Badi Chaupad, Jaipur	31.12.2022
3	Brij Nidhi Temple, Tripolia Bazar, Jaipur	31.12.2022
4	Tadkeshwar Nath Mahadev Mandir, Chaura Rasta, Jaipur	31.12.2022
5	Kalki ka Mandir, Badi Chaupad, Jaipur	31.12.2022
6	Mandir Shri Radha Krishna Ji, Near Gangori School, Jaipur	30.11.2022

MOBILISATION OF RESOURCES

Initially, for these works, after spot inspection of the sites, approvals were obtained at the official level, in which new suggestions received from heritage related organizations were adjusted. For these works, institutions and traditional techniques related to heritage conservation were adopted.

RESULTS ACHIEVED

Some of the assessment criteria are: -

- Conservation of Heritage sites in is important because: Conservation of heritage sites and buildings provides a sense of identity and continuity in a fast-changing world. Heritage sites and buildings represent the past history and culture of our nation.
- Heritage conservation is to satisfy customers' needs through the provision of quality conservation services at a competitive price.
- The benefit of heritage conservation is to create specific benefits for present and future generations.
- Heritage conservation is the preservation of cultural identity and the ability to pass on historical structures to future generations.
- Heritage tourism contributes to the preservation of cultural heritage by integrating various elements of heritage into the tourist product, such as monuments, folk culture, traditions, crafts, language, literature, music, art, historical urban environment, rural development, and natural environment. Careful planning of cultural heritage tourism leads to sustainable regional development and helps protect heritage resources for future generations.

SUSTAINABILITY

- **Financial:** Financial sustainability ensures that sites are conserved and maintained for future generations. Originality/ 'The need to preserve cultural heritage' is widely recognized by many different segments of society. Benefits of heritage tourism include high tourist arrivals and receipts, the multiplier effects within the industry and creation of employment opportunities for the local community.
- **Social and Economic:** Heritage has different developmental potentials that might contribute to the sustainable development of a given area. In terms of sustainable development these potentials are not necessarily economic, but also include social, environmental or cultural aspects. However, heritage by itself rarely holds tangible benefits if it is not properly managed. The key challenge for attaining sustainability is to focus management on a participatory approach, which ensures public participation in the process. The paper argues that a successful and effective management of heritage depends on the people, who must be able to 1) identify the appropriate heritage, 2) link it with key stakeholders and other topics, 3) design it into a proper service, and finally 4) sell the new service to users.
- **Cultural:** Regenerate cities and regions through cultural heritage. Promote adaptive re-use of heritage buildings balance access to cultural heritage with sustainable cultural tourism and natural heritage. Urban culture not only houses the newly built infrastructure but also our rich cultural heritage, in tangible and intangible form. Jaipur city in this regard sets a perfect example. The current paper is an attempt to focus the heritage tourism, urbanization and the issues.Secondary data available from different sources have been analysed, qualitatively and quantitatively, in context of urbanization and cultural heritage. The cumulative effect of various issues emerged due to haphazard urbanization has resulted in change of perception of the tourists. With urbanization, the tourism flow in Jaipur city has increased numerically but the share of the city in total tourists of the state has shown a decline. Therefore, a multidimensional approach is needed implementing the current policies and programmes of urbanDevelopment, mainstreaming the issues of cultural heritage preservation.
- **Environmental:** Regenerate cities and regions through cultural heritage Promote adaptive re-use of heritage buildings Balance

access to cultural heritage with sustainable cultural tourism and natural heritage. Built heritage plays an important role in expressing tangible and intangible values. They are visual links to the past, revealing how communities evolve socially, technologically and culturally. While some have retained their original function, some others have been adapted for new uses. Unfortunately, with the rapid increase of population and urbanization world-wide, many of these structures are increasingly under the threat of demolition, or in countries like the United States, Australia, United Kingdom and Italy they are under significant pressure to be environmentally sustainable; in other words, function with reduced carbon emissions while still retaining their heritage values.

- **Institutional:** Policies, regulatory framework, practices, legislation, strategies from local to national level having potential for replication elsewhere. Decision making process effective in assigning clear roles and duties to participatory actors and agencies. Management system that helps in mobilization of financial, technical and human resources in an efficient, transparent and accountable way.

TRANSFERABILITY

A critical part of a good heritage conservation strategy that fosters and preserves both tangible and intangible assets, is the issue of heritage skill transfer. Skill transfer can take place in a variety of ways. These include for example, apprenticeships where youth can learn the skills under a master craftsman.

LESSONS LEARNED

Some of our greatest achievements at heritage Construction have arisen from our work on historical buildings.Historical buildings can be repurposed for the modern age, affordably. Listed buildings can be sustainable buildings. Old buildings will always surprise you

REFERENCES

JSCL developed many smart infrastructures including the mammoth work of façade restoration of Jaipur Walled City by traditional methods which contributed in declaration of Pink City as UNESCO World Heritage Site in 2019.

CONTACT INFORMATION

Title of the Best Practice	:	Preserving Old Historical Heritage Temple, School and other Buildings
The location of the Best Practice	:	Walled city Jaipur
Name of the Winner (Name of the Applicant Institution)	:	Jaipur Smart City Limited Jaipur (Rajasthan)
Address	:	Jaipur Smart City Limited Jaipur, Pandit Deendayal Upadhyay Bhawan, Lal khoti, Tonk Road, Jaipur-302015 (Rajasthan)
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Water Tanker Pass issuance and Monitoring system with mobile app at Thiruvananthapuram, Municipal Corporation

Thiruvananthapuram Municipal Corporation, Kerala

BACKGROUND

This project aimed at bringing all tanker operators in the Thiruvananthapuram Municipal Corporation area under a single umbrella and to regulate the Water tanker service. The targeted goal has been achieved fully and all drinking water and non-drinking water truck movement in the city is now being done via the system only. Any illegal activity is identified and the vehicle detained by the health squad of the Corporation. There is no reported complaint from the public regarding the unauthorized collection of drinking water from polluted water sources.

Thiruvananthapuram Corporation, one of the largest corporations in Kerala having 214 Kilo Meter Square area and 9.68 lakhs population (2011 census), being the capital city of Kerala, a dynamic and vibrant city, have more business activities than any other cities in Kerala. Water supply is one of the mandates of the urban local body, enshrined in the constitution, powers and responsibilities are vested to the local body by the state enactments. But in Kerala, Kerala Water Authority is the Government agency to provide drinking water to the public. There are 2,91,528 water connections in the city corporation. That is around 30% population is not covered with the water authority's water supply system. Further there are 35,000 traders and more than 2,000 government as well as other institutions. The water supply in Thiruvananthapuram city is sourced from Aruvikkara dam having a capacity of 386.65 MLD and per day consumption is 355.65 MLD as per the data available with the Kerala Water Authority. There are certain locations, where water supply network of water authority is not available and there are break-down or bursting of water supply line frequently in many areas, which disrupts supply of water on a regular basis. Further many large institutions arranged water through private water tankers. There are more than 100 water tankers in the city and they source water from different source, including authorised vending point of Kerala Water Authority, ponds, lakes and such other water bodies. There had been so many complaints regarding sourcing of water from unauthorised points which are heavily polluted, which adversely affected the health of the general public. There was system in the city to control the same, even if there was a direction to the private water tankers to source water from the official vending point of the Kerala Water Authority, they were not ready to collect the same from the vending points since sourcing water from the ponds and such other water body was very cheaper and very near to the selling point. A few incidents occurred in the city where polluted water supplied to a few restaurants caused public health issues and in order to control or to regulate this unauthorised sourcing of water and to control the mafia working in this area corporation mooted a new system with the support of the e-platform.

This project has transformed the overall landscape of the tanker-based water delivery system which operated in Thiruvananthapuram Corporation. The general public who relied on water tankers for fulfilling the daily water requirements had no control over the quality of water delivered to them. The fact that most of the institutions like restaurants, malls, hotels etc in the city had to depend on tankers for water made the situation a huge public health concern. The project implemented a mobile app based public interface for booking water tankers and contained GPS based tracking and digital pass based source verification against each booking. The data stream from vehicle drivers, vending point operators and GPS devices converged in the servers from which meaningful information and alerts were given to the customer in real time empowering him with knowledge about the source, quality, and status of the water that he has paid for. The public was saved from exploitation and helplessness and was raised to a platform where they could raise their grievances and concerns directly to the corporation via digital medium. The internal systems were empowered using rapid training programs to handle issues, concerns, and complaints from the field on time. The reengineering processes involved in the implementation has transformed the way in which the corporation machinery operates and provided service delivery.

The project also separated drinking and non-drinking water delivery systems and made sure that the vehicles which supplied one is not used for supplying the other. Strict monitoring and testing framework was set up to ensure quality of the drinking water transported and delivered to the customer.

Technology Used: The system is developed using fully open-source technologies. The backend system and APIs are developed in an advanced open source MVC framework based in PHP. The system uses Postgre SQL RDBMS as the database backend. It is running in a Linux based cloud server utilising apache as the server software. The mobile components are developed using the Ionic framework which is a hybrid framework based on AngularJS.

Web Portal for Public: A web portal was developed and deployed as part of the project which interfaced with the general public. They were able to create accounts and book for water tanker service via this portal. The history and details of active bookings were available to them in real time via this portal. The central system could communicate with the end users via this system. The portal can be found in the address https://smarttvm.tmc.lsgkerala.gov.in .

Public mobile app for end users: To increase ease of service delivery, the project integrated a booking and tracking module to the corporation's Smart Trivandrum mobile app. The fact that most of the city residents had already installed the app and is relying on it for obtaining relevant information and notices from the Corporation made it a suitable candidate for adding the service instead of deploying a new mobile app exclusively for this project. All facilities which are available in the web portal were also provided in the mobile app too.

Software for centralised coordination: The key component of the architecture of the system was the central software which acted as the command and coordination centre connecting all the stakeholders to a single point. This acted as the brain of the system and allowed data transfer between various other connected systems.

Mobile app for drivers: The truck drivers were given an android mobile application which they can install in their own phone. The communication between the central system and drivers happens via this app. The details of the customers booking including quantity of water, location, contact number etc was communicated to the drivers via this mobile app. The digital pass issued by the corporation which can be used to collect water from KWA vending points was also delivered to the driver via this app.

Call Centre Software: The call centre was equipped with hardware and software for high call volumes. It could receive concurrent calls from multiple lines via a software component which was further integrated with the central system. Thus, the call centre executive could see the relevant information related to the caller like current and past orders, tickets etc on the screen when a call came in. Mobile number 9496434488 &land number 0471 2377701 are attached to this call centre

AIS140 GPS: The trucks were fitted with AIS 140 GPS devices which were directly integrated to the central system via HTTP protocol. The device fed the data in predefined format which allowed the system to determine the rea-time location of the truck.

Geofencing of vending points: The vending points were geotagged and the GIS information was fed to the central system. Based on this data and the data from the GPS device fitted in the truck the system could monitor and identify when a truck arrives at a vending point station.

Geomap based vehicle monitoring: The system was integrated with a geo map-based vehicle monitoring module which allowed real-time monitoring of the vehicles. The GPS devices fitted in the vehicles provided a continuous location data feed directly to the corporation's servers. This data was compiled and analysed by the system in real-time. The information about the status and location of the vehicles which operated in the city was then plotted on to a geomap interface. The users could visually see the vehicles in the map and determine where they are and what their status is. Map was colour coded to differentiate vehicles which are supplying water and those which are running empty. The system also allowed users to check the movement of a vehicle during a certain historical time. This helped in maintaining control over the vehicle movements and to prevent unauthorized operations of any sort.

KL based booking module and vehicle pass issue: The system was designed to accept bookings based on the volume of water required in kilolitres from the customer end. It did not operate on a trip basis and thereby it was the decision of the system to assign a particular vehicle to a particular customer. Many times, multiple vehicles parallelly operated to service a customer when booking is done for large volumes. The system keeps track of the total volume and the volume which has already been delivered. The cost of water corresponding to any difference in quantity which cannot be delivered to the customer will be refunded to the customer. This prevented exploitation of the public by the operators whereby the original tank capacity is less than the booked volume. As in most cases the customer was not be in a position to analyse the quantity of water delivered to them.

Service Delivery Channels: Many channels are used to book water tankers from the public. The system houses various mechanism to ensure inclusion of all classes of citizens as follows:

- Online booking and digital payment for anyone who has access to Internet and online banking
- Akshaya centre-based booking for anyone who do not have internet access but has online banking
- Bank challan-based cash payment option for anyone who do not have online banking

Public website	http://smarttvm.tmc.lsgkerala.gov.in
Mobile App Public(Smart Thiruvananthapuram App)	https://play.google.com/store/apps/details?id=com.smart.trivandrum
Mobile app drivers and Water Vending point operator (TMC Quick Pass Water Vendor)	https://play.google.com/store/apps/details?id=com.tmcqpw.vendor

MAIN FOCUS OF THE BEST PRACTICE:

Objective of the project

- To ensure that safe drinking water is available for public.
- To regulate the pricing structure of water tanker service and prevent exploitation of the general public by operators.
- To ensure proper availability of drinking water during droughts and critical events which cause water shortage.
- Prevent use of drinking water for other purposes like construction, gardening, agriculture etc.
- To prevent a public health crisis caused by consumption of polluted water and there be make Thiruvananthapuram a disease-free city.
- To replace the manual system with a digital platform making it easier for the general public to use and to ensure that service delivery is done on time with proper quality.
- To make the entire operations fully transparent and implement necessary monitoring mechanisms to supervise the operation of the system.

FINANCIAL PROFILE

Organization	FY 2020-21	FY 2021-22	FY 2022-23
Water tanker Vehicle Owners => Service Charge (Rs)	2,52,09,550	4,52,04,742	6,98,54,666
Kerala Water Authority => Water Charge (Rs)	1,58,20,410	2,31,02,656	2,81,17,609
Thiruvananthapuram Corporation => User Fee (Rs)	26,21,100	40,90,809	51,05,032

KEY DATES

DATES (days-month-year)	Significance/Achievement
5 Dec 2019	Thiruvananthapuram Municipal Corporation Council Passed the Bylaw
1 Jan 2020	Vehicle Licence Issue process started
8 Feb 2020	Water Tanker Booking Service opened forpublic
4 June 2020	Completed 10000 Water Tanker Trips
9 March 2021	Published the approved bylaw in Kerala Gazette
14 Sep 2021	Completed 50000 Water Tanker Trips
28 Sep 2022	Completed 100000 Water Tanker Trips
1 Dec 2022	Got 1st prize for Kerala State E Governance Award (category e-citizen servicedelivery)

ESTABLISHMENT OF PRIORITIES

The primary objective of the system is to provide clean drinking water to the customer within a minimum time period. The regulatory mechanism and execution system was constituted based on a bylaw which the council of corporation had passed. A software was developed and a team of health officials was set up to operate the system. The full process from empanelment of vehicles to distribution of payments to tankers was done with digital support. The software system formed the operating machinery and made decisions based on the provisions in the bylaw. The officers worked as part of the digital system which eliminated any manual intervention from any level as they did not have any decision-making powers. Training was given to drivers, officers, and vending point operators to familiarise them with the software and mobile apps. They were taught how to access the relevant information they need to operate on a daily basis. A 24/7 call centre was set up by the corporation to monitor the operations and to resolve any grievances from the public, drivers, vending point operators or officers.

MOBILISATION OF RESOURCES

Corporation utilised its own funds to develop the software systems and to purchase necessary hardware for operations. Once the operations began, the service charge collected by the corporation for each trip was used for operation and maintenance activities of the system. Since the revenue obtained as service charge is much more than the operating expenses, the system is fully sustainable and currently there is surplus funds in the project account.

- Implementing Officer -A Health Supervisor is given the charge.
- Nodal Officer - An officer from Kerala Water Authority is given charge for easy liaison with KWA.
- 25/7 call centre - Operated by corporation using its own staff.
- Transoft Solutions - Software vendor (Startup firm developed the system and to provide technical support).
- Federal Bank - Providing banking services for the system.
- Drivers and Owners - Operates the trucks and provides services to the public.
- Vending point operators - Verifies that water is taken from KWA vending points for each trip.

Elected Representatives

The leadership and initiative from the elected representatives, council and the Mayor of Thiruvananthapuram corporation was a major component in the success of the system. From passing the bye law to involvement in areas where public support is needed, they did a great job in both understanding the importance of the system and in communicating it to the public. The stringent stands taken by the council in dealing with the illegal collection of water from ponds and quarries has strengthened the enforcement squads and thereby has helped in eliminating illegal operations by the tankers.

Corporation Officials

The movement of the operating mechanism of water tanker management from a file based manual system to a digital system was very well accepted by the officials involved. The capacity building training conducted for the officials in this respect was a huge success and many significant suggestions and improvements were brought forward by them to fine tune the system. Once they understood the effectiveness and the speed at which actions could be taken, the officials were keen to bring in more protocols under the system. During the initial stages, the health officials strongly patrolled the city to detect and detain any illegal operators which ran parallel to the system.

Kerala water authority staff

The water vending points are all managed by Kerala Water Authority (KWA) at various locations under various divisions, Aruvikkara, Vellayamalam, PTP, Valakkode and Chozhattukotta. They are provided with an account in the online system through which they are able to access necessary reports for proper monitoring and analysis of the operations.

Vending point Operators

The KWA officials at vending points were very keen to be part of the system and learned to use the operator mobile app to scan the QR code and to get the information on the truck. They utilized the reporting mechanism of the system to derive daily reports and to track the details of tankers which collected water from the vending point.

Water tanker Operators

The truck operators were very cautious about entering into this project when the initial meeting was convened by the Hon'ble Mayor. Their concerns regarding reduction in revenue and possible micromanagement was the major reason. But once the system started rolling out fully, they understood the advantages both in terms of quality of service they could provide and the regular revenue stream they could access. Moreover, the association with corporations made them more acceptable to the customers. The small players were the ones who benefitted the most as in an open market they could not compete with the large players who bagged most of the contracts from big malls and hotels. This project provided a level playing field for all the operators and helped them to provide quality service to all customers alike.

PROCESS

One of the main hurdles we faced initially was the resistance from truck drivers to fall in line with the guidelines issued by the corporation. Regular training and communication were done with the group to ensure that they understood the importance of each direction. They used to collect cash from the customer initially as part of a habit that they had. Information was given to the customers not to provide any cash to the truck drivers for the service. This was communicated via SMS and also via the Smart Trivandrum mobile app. Once the service was completed, they were also asked to give feedback about the quality and to raise any grievance. This way the corporation was able to identify any problems which the customers faced. The processes and systems were tuned to prevent such problems and customer experience have improved a lot since the launch. The resistance from the public to resort to online and digital payment mechanisms were another challenge. There were certain class of people who were not tech savvy and did not have any digital payment mechanisms or who choose not to do any digital payments. Corporation setup a help-desk to help such customers to move to digital payments and to use online payment gateways with debit cards or net banking. This initial problem was solved very easily after COVID 19 lockdown when digital payments became popular.

RESULTS ACHIEVED

The impact of the system can be clearly seen in the drastic increase in the number bookings that the corporation receives on a day-to-day basis. The main objective of the system has been met various agencies and the Govt of Kerala has recognized the corporation for the exemplary intervention it did in this problem domain. The system is popular among the citizens and the businesses as it provides them with an economically viable option to get quality drinking water within minimum time. Also, the system helped in bringing strict separation between tankers supplying drinking water from those supplying water for construction purposes. Earlier drinking water tankers were used to supply construction water which was a source of pollution. By separate licensing norms, colour coding and GPS based monitoring the corporation has ensured that both classes of tankers operate exclusively in their own domain.

- Registered almost all water tanker vehicles operating in the city limits amounting to approx. 112 vehicles. Inspections were carried out on all vehicles to ensure that all Bye law conditions were adhered and licence was issued. Annual licence renewal procedure was implemented to re-evaluate vehicles every year.
- A Bye law detailing the operating principles and rules governing the system was passed by corporation and approved by Govt. of Kerala and published in the gazette.
- System helped to provide 24 * 7 water tanker service to the citizens.
- AIS 140 GPS devices were fitted in the vehicles to provide real time location data.
- Regular water sample collection and testing facility was implemented for ensuring quality of water. The test data is published in the web portal for social auditing purposes.
- Public water tanker booking facility was provided through multiple booking channels.
- Call Centre operation was provided 24*7 to ensure proper grievance redressal of customers on time.
- Driver mobile app was provided to issue digital passes which can be verified by KWA officials from the vending point.
- Strict separation of vehicles transporting drinking and non-drinking water was implemented with colour coding for easy identification. (Blue for drinking and Brown for non-drinking).
- Level playing field was brought about in the industry whereby even small players could earn a livelihood without falling prey to the competitive pricing models implemented by large players.

- Since all water is being collected from KWA vending points, it provided additional revenue to KWA and prompt payment was ensured on a weekly basis.
- As no payment credit was involved in the entire system, the operators who had problems in collecting payment from customers on time earlier, were hugely benefited. The corporation ensured that the payments reached them on time.
- The cost of service was regulated thereby preventing exploitation of customers by the operators during periods of high-water scarcity.
- The district administration, KWA, Corporation and related departments had to do additional planning and implementation of water tanker-based delivery to consumers when major events like pipe burst or drought happened. Now this system takes care of the additional load which comes up during such periods.

SUSTAINABILITY

The system operates on funds which it generates itself via the service charge collected per trip from the public. As the operating costs are less than the total revenue and as it does not depend on any outside funds to operate, the system is economically sustainable. The truck operators were charging hefty rates for the service before introduction of the system from the public. As there was no alternative, they had to succumb to the pressure put on by the truck operators to obtain the service. They made sure that the customer was put in pressure by delaying the service. Now the rates are pre-published and customers can book for service online and make payment directly to the corporation via online modes. Since there is no cash transaction between operators and customers there is no friction in the field. Since the public perceives the system as a boon to them and recognizes its value, it is socially sustainable. The corporation was struggling with the problem caused by supply of contaminated water by trucks to households and businesses. There were regular complaints regarding such events and public health was being affected. Enforcement squads of the corporation had to spend lots of man hours patrolling the city to detect and book violators. Since implementation of the system, the general public became aware of the benefits of using this service and thereby any player outside the network who illegally operated stopped getting any order. Also, the system is backed up legally using a bye law which the corporations council has passed. So, the system is institutionally sustainable as the top officials and political administrative heads are seeing the benefits of the system. The primary objective of the system is to supply quality water to households and businesses and based on the data we have; it is clear that it has met the objective clearly. The system is very popular with the residents of Thiruvananthapuram corporation and with the businesses like restaurants and hotels operating here. The perspective of the general public has changed and they understand that quality water can be obtained via this service and that any other private player supplying water to them may be taking water from unsafe sources. So culturally and environmentally the system is sustainable and has empowered the people to act up on a huge social problem.

TRANSFERABILITY

The system is handling the water supply service perfectly in the corporation and all scenarios which arose during its operation have been handled easily. The system can be replicated to any corporation or municipality which is facing challenges similar to that of Thiruvananthapuram. Govt. of Kerala has identified the project as having a major impact on solving the septage problem and has mooted a proposal to replicate the system all over Kerala to monitor taker-based water supply.

LESSONS LEARNED

The primary motivation behind the implementation of the system is the responsibility that the corporation has over public health. As per the constitution of India, the local bodies are entrusted with the responsibility of providing clean drinking water to the community. The corporation took its role very seriously and was having various discussions and consultations with experts from various domains to prevent the issue of supplying contaminated water to takers. We traced certain public health issues in certain areas in the corporation to the supply of contaminated water in tankers taken from unsafe sources. So, it was of paramount importance to the corporation to find a solution to the problem.

REFERENCES

2022-23 Kerala State Best E Governance Award (eCitizen Delivery category)

Image: Keral Chief Minister at an event related to the project (2022-23 Kerala State Best E Governance Award (eCitizen Delivery category)

TIMES CITY

Corp makes digital passes must for water distribution

Soon, More Authorized Vending Points To Come Up In City

Image: A Newspaper Clipping related to the project

CONTACT INFORMATION

Title of the Best Practice	:	Quick Pass-Centralised digital pass issue system for septage collection, transportation, disposal and payment
The location of the Best Practice	:	Thiruvananthapuram Municipal Corporation Area; Thiruvananthapuram PIN-695 033 (Kerala) Kerala.
Name of the Winner (Name of the Applicant Institution)	:	Thiruvananthapuram Municipal Corporation
Address	:	Thiruvananthapuram Municipal Corporation Area; Thiruvananthapuram PIN-695 033 (Kerala) Kerala.
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Affordable, Reliable, Safe, and Sustainable Public Transport in Indore

Atal Indore City Transport Services Limited (AICTSL), Madhya Pradesh

BACKGROUND

Being the cleanest city in India, Indore's administration has time and again emerged as a pioneer of waste mitigation and management strategies. One such strategy developed by Indore Municipal Corporation was to create bio-CNG from organic waste collected daily from the city. The bio-methanation plant setup on PPP model in Indore has the capacity to produce 500 Tons-per-day of bio-CNG. The Bio-CNG produced from this plant is used to fuel public transport buses that operate in Indore city. The bio-CNG used in the buses is provided to Atal Indore City Transport Services Limited (AICTSL) a bus SPV at a ₹5 discount from market rate thus providing financial value to city administration. Today AICTSL operates 179 CNG buses which constitute nearly 41% of its intracity fleet helping in reducing tailpipe emissions from HCV in the city and increasing air quality. These 179 bio-CNG fuelled buses are being operated in the city under AMRUT scheme initiated by the Government of India.

Indore city is spread across nearly 882 sq.km and consists of 120 villages apart from the area that comes under the ambit of Indore Municipal Corporation. Being the economic capital and educational hub of central India, Indore has seen rapid rise in its population in the past decade. This has resulted in increased traffic on city's roads as mobility needs of the populace have translated to introduction of large number of private vehicles on road daily. At some places in the city, traffic has seen a growth of nearly 200% between 2012 and 2022.

179 CNG buses are being operated in the city replacing traditional ICE buses.

FINANCIAL PROFILE

Organization	FY 2021-22	FY 2022-23	TOTAL
Owner Sanctioned Amount (Rs.)			
Partner I Sanctioned Amount (Rs.)	5.77 Crore	15.11 Crore	20.88 Crore

MAIN FOCUS OF THE BEST PRACTICE

a) Increase public transport availability in Indore city & Induce mode shift from private transit modes to public buses.

b) Reduce carbon emissions through introduction of alternate fuelled (CNG) buses.

KEY DATES

DATE(S)	Significance/Achievement
7-November-2022	"Award of Excellence" by Ministry of Housing and urban Affairs, Govt. of India

ESTABLISHMENT OF PRIORITIES

The core issue behind this project was increased use of private transport and increased air pollution in the city. Thus, the priority was boosting alternate fuelled Public Transport (PT) availability in the city to ensure reduction in carbon emissions. Increased PT bus availability induces modal shift of commuters from private modes of transport and other polluting modes of intermediate para transit to PT buses. This ensures that tailpipe emissions are reduced and traffic congestion eases. Further, since the PT bus fleet is augmented with bio-CNG fuelled buses, the tailpipe emissions from PT buses are also significantly reduced.

MOBILISATION OF RESOURCES

Atal Indore City Transport Services Limited (AICTSL) has contracted 'Maa associates' as the bus operating agency (BOA). The roles and responsibilities of BOA are:

a. purchase the buses,

b. operate the buses on routes and schedules provided by AICTSL,

c. maintain the buses for the entirety of contract period,

c) Collect fare from the passengers.

The roles and responsibilities of AICTSL include the following:

a. provide BOA with 40% of the buses capital cost as upfront subsidy,

b. provide BOA with routes, schedules, and fare structure for the bus service,

c. provide space for establishing bus depot.

RESULTS ACHIEVED

Inclusion of 179 CNG buses in Indore's PT bus fleet has boosted PT availability index in the city by 70% (from 0.07 to 0.12[i]). Each CNG bus carries close to 440 passengers per day during its scheduled run thus providing mobility to more than 78,000 citizens in Indore. Of these 78,000 passengers, close to 40% are students and almost 30% are women from different backgrounds.

Not only this, but the Bio also-CNG fuelled buses produce almost 12% less Carbon dioxide (CO_2) as compared to similar make and model of diesel fuelled buses, which translates to 6,322 kgof CO2 emission reduced every day. Therefore, over their contract's life span of 7 years, these bio-CNG fuelled buses will likely save nearly 16,000 tons of carbon being emitted in Indore city[ii].

SUSTAINABILITY

AICTSL's bio-CNG fuelled buses provide mobility option to 78,000 passengers per day. Most of these passengers are captive users from low economic strata of the society, i.e., these passengers do not own any type of private vehicle thus they rely entirely on shared transport modes. Without PT buses, these passengers will be forced to use Intermediate Public Transport (IPT) modes that are highly unregulated, very unsafe, unclean, and do not provide any sort of travel reliability other than speed. AICTSL's PT buses are an essential part of life for such passengers as they use this bus service for accessing employment opportunities, educational and health institutions, and visiting places of leisure.

TRANSFERABILTY

While many Indian city's/ state's PT operating authorities are operating CNG buses today, none of them are using CNG produced locally to fuel their buses. For effective and efficient production of bio-CNG from organic waste, the quantum of purity of the waste is over 90%, i.e., the waste from which CNG is to be produced must constitute of at least 90% organic matter. This is where Indore city excels, as through dedicated efforts of the Indore Municipal Corporation and continued citizen participation Indore achieves >95% waste segregation at the source (homes) itself.

For replicating this project, it is essential that high fidelity in waste segregation at source is achieved.

[i] Calculated according to service level benchmarks published by Ministry of Housing and Urban Affairs (Microsoft Word - Service_level_ Benchmarks_-17-11-09.doc - pdfMachine from Broadgun Software, http://pdfmachine.com, a great PDF writer utility! (mohua.gov.in))

[ii] Calculations based on carbon emissions from : Electric vs. Diesel vs. Natural Gas: Which Bus is Best for the Climate? - Union of Concerned Scientists (ucsusa.org)

REFERENCES

Image: Public transport service in Indore city

Image: Bio CNG Plant in Indore City

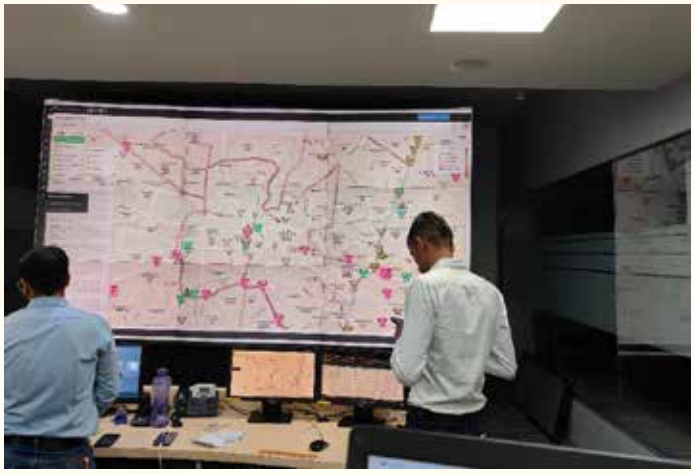

Image: Bus Routes are monitored

Image: A solar enabled Bus Stop in Indore city

Image: Another view of a Bus transport facility in Indore City

CONTACT INFORMATION

Title of the Best Practice	:	Affordable, Reliable, Safe and Sustainable Public Transport in Indore
The location of the Best Practice	:	Indore Urban Area (Madhya Pradesh)
Name of the Winner (Name of the Applicant Institution)	:	Atal Indore City Transport Services Limited (Supporting Partner: M/S Maa Associates Pvt. Ltd.)
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Kochi Water Metro Project (KWMP)

Kochi Metro Rail Limited, Kerala

BACKGROUND

Kochi Water Metro (KWM), an ambitious, huge and environment friendly, sustainable integrated water transport system revolutionizing urban connectivity in the picturesque city of Kochi was inaugurated on 25th April 2023 by the Honourable Prime Minister of India and has started revenue operations with effect from 26th April 2023. This visionary project aims to connect the island communities to the mainland, fostering socio-economic growth, improving livelihoods, and enhancing tourism prospects. Kochi Metro Rail Limited (KMRL), a joint venture company of the Government of India and the Government of Kerala, has been entrusted with the execution of this prestigious water metro project. Kochi Water Metro Limited (KWML) is entrusted with operations and maintenance of the entire water metro system.

Kochi is Kerala's main port, commercial hub, and the largest city, with a population of around 2.1 million people (more than 3 million, if suburbs are taken into account). It is the largest and the most populous metropolitan area in Kerala and forms part of the Ernakulam district in the state of Kerala. Kochi is characterized by the presence of rivers, canals, estuaries, port waters and surrounding island groups like Fort Kochi, Mattancherry, Willingdon Island, etc.

Being the largest city in the state of Kerala, challenges for a sustainable transportation has always been one of the major struggles, especially, when it comes to convenience of islanders, they still had to depend on ageing and non-reliable conventional water transport solutions or lengthy alternate roadways to come to main land, where majority of the facilities are available.

ESTABLISHMENT OF PRIORITIES

The priority was to establish a safe and reliable modern metro-like water transport system suiting the geography of Kochi region by connecting major island communities in and around the mainland (City), which would have direct impact on their socio-economic development. With many limitations in expansion of city roads, ever growing traffic congestion in existing roads and related carbon emissions, there was an immediate necessity for alternative and much greener transportation option, especially for lakhs of islanders.

Changing the Public's outlook about ferries, ferry stations, ticketing systems, access infrastructure and provision of reliable mobility solutions including last mile connectivity was the aim of project implementation. Government organizations like District administration, IWAI, PCB, KSEB, Ports, etc. along with public representatives have contributed for establishing the base for project implementation to benefit daily commuters as well as tourists from/to islands.

MOBILISATION OF RESOURCES

The ambitious project, with an investment of INR 1,136.83 Crore, is supported by direct contributions from the State Government of Kerala and funding from KfW through Indo-German cooperation. Project management is being handled by Project Executing Agency (PEA) i.e. Kochi Metro Rail Limited (KMRL) and works are sub-managed by expert project consultants appointed by the PEA.

Kochi Water Metro Limited (KWML), a joint venture between the Government of Kerala (GoK) with a 74% stake and Kochi Metro Rail Limited (KMRL) with a 26% stake, is responsible for the operations, maintenance, and management of the Water Metro. Starting from feasibility studies, property acquisition, public coordination, statutory approvals, tendering and procurement, contract management, site management and supervision, commissioning, etc. are being jointly handled by PEA and Project Consultants in consultation with District Administration.

THE PROCESS

Land acquisition and transfers, administrative and statutory approvals, CRZ clearance,Product and technology finalization, Lockdowns/logistic disruptions due to Covid were all major hurdles during the initial project phase. Public meetings were held by the district administration during project realization phase for better understanding of public demands/requirements and to explain the long-term project benefits, thereby ensuring continuous support from public, regional communities and local bodies. Involvement

and cooperation of Panchayats, Municipalities and Corporation in geographical project limits were ensured for executional and operational support of the project. Following long-term benefits were forecasted:

- Provisioning first and last mile connectivity for island community with other modes of public transport to the main land.
- Generation of employment opportunities for the islanders, thereby elevating living standards of island community.
- Facilitating infrastructure, trade and tourism development of the island community and thereby improving their livelihood opportunities.
- Promotion/exposure to island culture, traditions and resources, adding socio economic development of island communities.
- World class transport facility for the island dwellers.

Premier institutes and proficient technical advisors have supported the project for product and technology finalization during difficult stages. Being one of the first projects in the country of such a nature has motivated all the stake holders to cooperate well within their limits. The involvement of Kudumbasree in operational sector of water metro is a great example of water metro's vision towards women empowerment.

The success of the project is evident from ridership data till date. Almost 14 lakh + commuters have already utilized the services of water metro since its inception in April 2023. It is to be noted that this achievement is only from the first two routes that have been operationalized on date. Not just daily commuters, but also there is a very heavy tourist footfall in the system considering international standards adopted throughout the system.

RESULTS ACHIEVED

As already stated, the success of the project is evident from the ridership data till date. Almost14 lakh + commuters have already utilized the services of water metro since its inception in April 2023 (in a span of just 8 months). It is to be noted that this achievement is only from the first two routes that have been operationalized on date. The following are main results contributing to urban liveability, quality of life and societal impact.

a) **Aesthetics** – State of the art, most modern battery electric air-conditioned ferries for passenger commuting. Metro modern terminals/ stations with automatic fare collection systems and Customer care centre. Metro-like experience for commuters in the water.

b) **Safety** – All boats in the water metro system are equipped with navigational equipment's like Radar, Thermal camera, Echo-sounder, DMR, VHF, Fire alarm systems, Vessel Automation System (VAS), Passenger Announcement System (PAS), Passenger Information Display System (PIDS), CCTV, panic buttons and manual emergency call points, etc.

There are also 4 no. of Emergency Response cum Workboats for supporting the main fleet of passenger boats in case of emergency and for maintenance. Workboats can also serve as ambulance boats in case of a medical emergency.

At Terminals – Automatic Fare Collection (AFC), PAS, PIDS, CCTV, Floating pontoons, Fire alarms, UPS and DG Backup, Passenger Control System (PCS) to avoid overcrowding (Introduced for the first time in India).

Floating pontoons are adopted to facilitate hindrance free embarkation and disembarkation of even physically challenged and elderly commuters. Pontoons ensure equitable/universal access to passengers including disabled by maintaining same levels with boat during tidal variations or floods, ensuring safe passenger access between terminal and boats.

c) **Environmental quality** – Highly energy efficient ferries with low carbon footprint and nil disturbance to aquatic flora and fauna. Modal shift shall bring down carbon emissions and ensure a journey towards net zero emissions. Almost nil disturbance to river/ canal shorelines thereby protecting the interest of island communities.

d) **Efficiency** – Ultra most efficient hull with low carbon footprint and nil disturbance to aquatic flora and fauna. Reduction in carbon foot print thereby ensuring net zero emissions. Reduced travel time and increased reliability. De-congestion on the roads,thereby reducing the traffic, road maintenance, etc.

e) **Equity** – Employment opportunities at various portfolios created like project management, operations, maintenance, etc. thereby elevating living standards of community including that of islanders. Equitable/universal access to passengers including disabled by deploying floating jetties for the first time in public water transport system in India.

f) Integrated Transport system and common mobility cards for Interoperable tickets for Water Metro and Rail Metro.

OTHER DISTINGUISHED ACHIEVEMENTS include the following:

- Water Metro Ferry has already achieved "1st place as part of GUSTAVE TROUVE AWARD-2022 (FRANCE) in electric passenger boat category".
- The Economic Times-energy leadership awards 2023 for "excellence in EV Infrastructure".
- Shiptek international awards 2023 for "Most Innovative and Sustainable project".
- Global Maritime Summit awards for "Efficient operation of a fleet of modern ferries" and "A well-knit terminal network along inland waterways".
- MoHUA recognition for Water metro project during 16th Urban Mobility India Conference and Expo-2023 in the Category of "City with the Best Green Transport Initiative".
- Urban Infra Awards 2023 for the "Most Innovative Water Transit System of the Year".

SUSTAINABILITY

Kochi Water Metro is an ambitious and environment friendly, sustainable integrated water transport system revolutionizing urban connectivity in the picturesque city of Kochi. This visionary project aims to connect the island communities to the mainland, fostering socioeconomic growth, improving livelihoods, and enhancing tourism prospects by fostering island culture and practices. The transformative potential of the Kochi Water Metro Project cannot be overstated. By bridging the gap between the islands and the mainland, the project is expected to uplift the island dwellers through improved job opportunities, trade facilitation, and enhanced accessibility. This integrated water transport system offers seamless intermodal connectivity, linking water metro terminals, bus terminals, and metro rail networks, providing commuters with a comprehensive and integrated public transportation experience.

One of the main highlights of the project would be the establishment of biggest network of electric superchargers in marine crafts and this would go on to become the largest battery electric boat network in the world with a central command and control centre. Nevertheless, Water transport still remains as one of the cheapest modes of transport as it doesn't require huge infrastructure development like roads, bridges, etc. There is hardly any congestion in the waters and with no detour required in most scenarios, travel times and expenses can be quite cost-effective. Kochi, with abundant water scape, only promotes this idea further.

This innovative initiative harmoniously merges state-of-the-art technology, environmental responsibility, and community-centered design. Poised to drastically reduce carbon emissions, the project represents a transformative step towards a greener, more inclusive future. The water transport system envisaged for Kochi focuses not only on the ferry services as the mode for public transportation but also envisions a holistic development of the areas being connected by waterways as well as integrating the waterway system as a part of the entire public transport system of the city. Apart from the ferry service development, the project also looks into developing the existing and new roads providing increased and better access to the jetties and also within the islands, ensuring safety and security to all its users by way of active and well-lit streets, promoting use of small occupancy feeder modes to access the jetties, promoting property development around the jetties and place making. Effective use of inland waterways with the environmentally friendly electric boats is offering multi-fold benefits.

TRANSFERABILITY

Landscapes with rivers, canals, backwaters or any other navigable waterways can adopt the concept of water metro for enhanced passenger commuting and to de-congest roads, thereby reducing carbon footprint and ensuring net zero emissions. Kerala has a waterway of approx. 900 km length including lakes, rivers, etc. wherein the expansion of the scope of this project is possible. About 40 cities in India like Varanasi, Srinagar, Ayodhya, Alleppey, Mumbai, Kolkata, Goa, etc. can adopt the idea of water metro for a sustainable transport approach. Promotion of waterway tourism and reduction in travel time are added advantages of this initiative. It is understood that similar systems are under consideration/implementation at Ayodhya, Varanasi and Assam. Spanning an impressive 76 kilometres, the Kochi Water Metro project connecting 10 islands through a network of 38 water metro terminals and 78 boats (of mostly 100 pax capacity) featuring cutting-edge design and technology, will establish itself as one of the most unique projects implemented with a Centralized operation control and command centre.

LESSONS LEARNED

Proposal and establishment of such a system shall be with due consideration to available resources and geography of the intended location. The need of the end consumers or the actual commuters to be clearly understood. The exact replica of one system might not work on the other side, hence thorough studies are required for ascertaining the exact needs and demand. The system envisaged shall be adaptable for future demands since technology is evolving day by day and wherever possible manual intervention shall remain reduced. This shall bring in faster resolutions and uniformity in decisions. And above all, suitable repair and maintenance infrastructure shall be established as part of project implementation, which will largely reduce the burden and cash outflow during operational phase. As is the case with any metro system, development and implementation of alternate revenue models has to be planned well ahead of operational commencement. Collaboration with places of public interest, private charter and tour services, leasing out of spaces, introduction of seasonal travel passes can all add up to total ridership figures. Addition of feeder services to connect most remote areas, integration with other transport modes, ticketing using smart interoperable travel cards, etc. will add value to the concept. Utilization of green energy initiatives will add to overall project sustainability.

REFERENCES

Image: Kochi Water Metro project was dedicated to the nation by the Hon'ble Prime Minister of India Shri Narender Modi on 25th April, 2023 in the gracious presence of the Chief Minister of Keral, Shri Pinarayi Vijayan

Image: Another view of the Inauguration ceremony of the project

Image: A Panoramic view of Kochi city behind high court water metro terminal.

Image: Some snapshots of the Kochi Water Metro project

Image: Boat charging and chargers installed atop floating pontoons

CONTACT INFORMATION

Title of the Best Practice	:	KOCHI Water Metro Project (KWMP)
The location of the Best Practice	:	Kochi (Kerala)
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