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| Theme Paper | Policy Review | Case Studies

Resilient urban economies. Cities as drivers of growth and recovery

G20 भारत 2023 INDIA

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FROM THE EDITOR-IN-CHIEF

Since the global financial crisis in 2009, urban economies have been struggling. The COVID-19 crisis in 2020 and the stimulation induced inflation has worsened the situation. 2023 has been a particularly challenging year for global urban economies because of the rise in central bank policy rates coupled with the disruption in supply chains due to the war in Ukraine. This continues to weigh on economic activity across various geographies. As per the International Monetary Fund (IMF), global growth is projected to fall from an estimated 3.5 percent in 2022 to 3.0 percent in both 2023 and 2024.

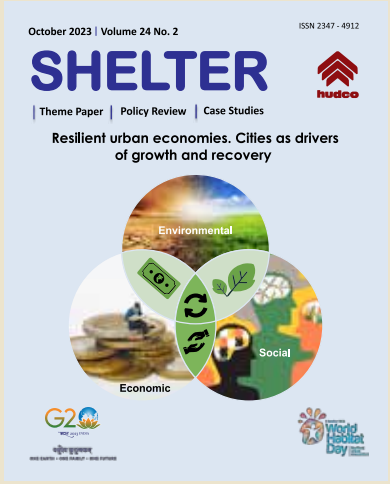
Cities are the engines that create value that boosts economic recovery. Given the size of the contribution of cities to the national economy, the future of many countries will be determined by the productivity of its urban areas. ((UN-Habitat), 2022).For this economic growth and recovery to be sustainable and carbon neutral, we need local governments to plan for and anticipate negative shocks to their economic ecosystems and allocate the necessary resources to mitigate, withstand and recover from these shocks. Urban economic resilience will enable cities to create and put into action response and recovery strategies to deal with shocks like the COVID-19 epidemic and other urban adversities. Building urban economic resilience necessitates achieving the resilience of the local business environment, the labour market conditions, the financial environment, economic governance, and infrastruture.

India fortunately has been an exception to the global economic slowdown. IMF has identified India as a "bright spot" in the world economy and a key contributor to global growth in the coming years. The Indian economy edged past the UK to became the 5th largest in the world in December 2021 quarter (IMF) and is slated to be the 3rd largest economy by 2028 (Economic Research Department report of SBI).In nearly a decade, India has leaped from the 11th place to the 5th place, powered by a GDP growth rate that eclipses most of the world's largest economies. However, given the significant contribution of the vulnerable informal sector in the Indian economy certain risks prevail and are being addressed through various programmes of the Govt. of India. Some of these programmes include the 'PM Street Vendor's Atma Nirbhar Nidhi' (PM SVANidhi) Yojana, Pradhan Mantri MUDRA Yojana (PMMY) and the Jan Dhan Yojana' (Financial Inclusion for All).

Indian cities contribute 63% to country's GDP and as per a joint report by CBRE and CREDAI; this contribution will grow to 75% by 2030. Building the capacities of ULBs is central to it being economically resilient. Realising this successive Central Finance Commissions have been increasing their grant outlays to Urban local Bodies. The 15th Finance Commission (FC-XV 2021) has recommended 1.5 lakh crore as grants to Urban Local governments for the period 2021-22 to 2025-26 - which is a 78 percent increase over last time. Also, substantial increase in capital investment outlays have been made by the Govt. in the Union Budget 2023-24 to enhance growth potential and job creation, crowd-in private investments, and provide a cushion against global headwinds. The capital investment outlay has been increased for the third year in a row, by 33% to ₹ 10 lakh crore, which is 3.3% of GDP. To attract capital investments in cities, the Govt. of India has also launched a slew of mission mode programmes like Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Smart Cities Mission and Swachh Bharat Mission.

This volume of Shelter is based on the World Habitat Day theme of "Resilient urban economies. Cities as drivers of growth and recovery" and contains an array of articles in three sections. The articles provide diverse insights into range of issues related to the theme of building urban economic resilience imperative for safeguarding urban investments and paving the way for a forward-looking, risk-aware, inclusive

INSIDE



and integrated approach to sustainable urban development. The theme paper by A K Jain advocates adopting the circular natural ecosystems for urban development that merges economy with ecology. The paper by Rinky Haldar underscores the significance of public spaces in nurturing economic resilience within urban environments. In the policy review section, the paper by Ramakrishna Nallathiga focuses on the potential of solid waste management in the circular economies of cities. The paper by Dr. Girija K Bharat et al highlights the challenges and a strategic roadmap for sustainable and resilient water supply in urban India. The paper by Azka Jabeen et al underlines the impact of pedestrianisation in enhancing walkability in urban spaces.

The case study section features a paper by Dr. Barsha Poricha on rejuvenating mountain springs in Dharamshala. The paper by Saadia Azim showcases 'Bangla Sahayata Kendra' (BSK) implemented in West Bengal that provides a single access point for easy and fast access to public services.

I thank all the contributors for an overwhelming response to this issue. I hope the readers enjoy the issue as much as we did putting it together. We value your feedback and would appreciate your comments.

Theme paper

Policy Review

Case studies

IN THE BOX

51st ITEC Training Programme for Overseas Participants on Formal Solutions to Informal Settlements March 20, 2023 – April 14, 2023

HUDCO's Human Settlement Management Institute (HSMI) organised the 51st ITEC one week training programme on "Formal solutions to Informal Settlements" from 20th March to 14th April, 2023. The programme is supported by the Ministry of External Affairs (MEA) under the Indian Technical and Economic Cooperation (ITEC) initiative. The ITEC Program was instituted by the government on 15th September 1964 as a bilateral programme of assistance of the Government of India.

FSIS Batch 2023 with dignitaries, HSMI faculty and senior HUDCO officials at the Inaugural Session

The Programme was inaugurated by Shri Kuldip Narayan, Chairman & Managing Director, HUDCO and Joint Secretary & Mission Director, Pradhan Mantri Awas Yojana (U), Ministry of Housing & Urban Affairs (MoHUA), Govt. of India in the presence of Shri M Nagaraj, Director Corporate Planning, HUDCO, Shri D Guhan, Director Finance, HUDCO, Dr. Sukanya Ghosh, Executive Director (Training), HUDCO's HSMI and senior officials of HUDCO and HSMI. Ms. Varsha Punhani, Fellow HSMI was the Programme Coordinator.

Participants of the 51st ITEC training programme at Timarpur Waste to Energy plant

The Programme was attended by 25 participants from 19 countries across the world namely, Belize, Cameroon, Commonwealth of Dominica, Ethiopia, Gambia, Lesotho, Malawi, Mauritius, Mongolia, Niger, Paraguay, Peru, Romania, Senegal, South Sudan, Sri Lanka, Tajikistan, Tanzania and Tunisia. The participants were urban development sector professionals and officials from various levels of government. The course was divided into five modules covering various aspects like Urbanisation, New Urban Agenda, SDGs, Land Regulations, Growth of Informal Settlements, Planning and Design Guidelines, Options for Rehabilitation, Provision of Basic Services & Infrastructure and Livelihood options. The various programmes of the Government of India to improve cities and to provide decent living to all, such as Housing for All, Swachh Bharat Mission and National Urban Livelihood Mission were also covered during the course of the Programme.

International Participants at Chausat Khamba in Nizamuddin Basti

To make the Programme interesting and knowledge sharing, it was structured to have a mix of technical sessions, site visits and group exercises. The participants visited Jaipur and Agra to get an insight into slum rehabilitation projects across various states in India and also experience the rich and layered cultural history and heritage of India. Technical and sectoral experts were invited to take classroom sessions. Some of the notable speakers included Mr. David Dodman, Director, IHS, Rotterdam, Mr. A K Jain, Former Commissioner, Delhi Development Authority, Dr. Neelima Risbud, Former Head of Housing Department, School of Planning & Architecture, New Delhi, Ms. Banashree Banerjee, Independent Consultant and Associate Staff Member, IHS Rotterdam and Dr. Madhu Rani Teotia, Director, Urban livelihood Mission, MoHUA, Govt. of India.

AN ITINERARY FOR RESILIENT, CIRCULAR AND GREEN URBAN ECONOMY

A K JAIN

While moving towards the World's third largest economy, India has embraced the theme of Vasundhara Kutumbkam- One Earth, One Family, One Future. It endeavours to interface the ecology and economy and make the earth more inclusive, resilient, and sustainable. This means adopting the circular natural eco systems which merge economy with the ecology. This involves putting together the concepts of Sustainable Urban Networks for Dynamic and Resilient (SUNDAR) India, Lifestyles for Environment (LiFE), 7 imperatives of economy, Urban Infrastructure Development Fund, Value Capture Finance and various other financing tools.

A. K. Jain worked as Commissioner (Planning), Delhi Development Authority and as a member of the Committee of the Ministry of Housing and Urban Affairs on DDA (2015). He was a member of UN Habitat (2007-12). Author of several books, he is a visiting faculty in planning and architecture. He was awarded 2nd Urban Professional Award 2014 at World Urban Forum in Medellin, Colombia, IBC Lifetime Achievement Award (2023), Living Legend (2022) by the Indian Institute of Architects (NC) and the Lifetime Achievement Award by the Smart Habitat Foundation (2022).
Email: ak. jain6@gmail. com

Introduction

In India the number of towns and cities have increased from 5161 in 2001 to 7933 in 2021 and census towns from 1362 in 2011 to 6125 in 2021. As per the Census 2011, there are 475 Class I cities (each with a population above 1 lakh) including 53 million plus cities. The million plus cities together constitute 42.63 per cent of the total urban population, while the Class I cities (including million plus cities) have 70.20 per cent of the total urban population. 3 mega-cities, viz. Greater Mumbai (18.4 million), Delhi (16.8 million) and Kolkata (14.1 million) have crossed the 10 million population mark, while five cities, viz. Chennai, Bengaluru, Hyderabad, Ahmedabad and Pune have more than 5 million population. From 432 million urban population in 2021, it is projected that by the year 2031, 600 million people will live in urban areas and 78 cities will become metropolitan (Table 1).

In 2030, with over 1.5 billion inhabitants, India with a sixth of world's population, will be the most populous country. It will have the world's largest workforce and will be the world's third largest economy. With 50% of its population below the age of 25, India has the world's largest work cohort. The ongoing process of urbanisation is vital for economic growth, as in 2030, 75% of GDP and new jobs will be created in cities (from 63% in 2011), putting pressure on infrastructure and the

Table 1: India's Urban Trajectory

Year	2011	2031
Population	1210 million	1440 million
Urban Population	377 million (31.16%)	600 million
Cities and Towns	7935	-
Million + Cities	53	78

Source: Census of India, 2011 & McKinsey Report, 2010.

environment in terms of pollution, water and energy shortages, climate change, transportation, and utilities. Climate change has become an imminent reality with a rise in global temperatures, changes in rainfall, floods, droughts and intense heat waves. The increasing emissions, heat and fossil fuel usage for transportation and electricity are affecting the micro-climate and human health.

India's Urban Missions

Since 2014, the Government of India has launched several new urban missions, viz. Smart Cities Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Pradhan Mantri Awas Yojana, Heritage City Development and Augmentation Yojana (HRIDAY) and Swachh Bharat Mission (SBM). The Smart Cities Mission envisages development of 100 smart cities which are infused with intelligence, integrity and inclusion with state of art infrastructure services, transport and housing for all. The Atal Mission of Rejuvenation and Urban Transformation (AMRUT) has covered more than 5,800 projects related to water, green space and mobility. The Pradhan Mantri Awas Yojana Urban (PMAY(U)) is reaching the target of constructing 12.2 million houses. The Swachh Bharat Mission (Urban) (SBM(U)) tackles urban sanitation and waste management, having provided a record 9 million toilets. The plans under these missions are based on digital planning via computing processes with net zero energy, water and waste together with circular systems.

The PM Gati Shakti Master Plan, launched in 2021, focuses on next generation sustainable infrastructure for seamless movement of people, goods and services. It leverages new technologies in planning, breaking the silos of departmentalisation to achieve ease of doing business. It has coordinated with the Indian Space Research organisation (ISRO) for spatial planning, engaging BiSAG (Bhaskar Acharya National Institute for Space Applications) and Geo Informatics. This GIS platform builds over 1200 data layers from Central Government Departments and 755 from the States/Union Territories. This helps to attain economic growth that harmonises with environmental imperatives. New technology and data driven planning are helping the implementation of the Master Plan with speed, scale and skills, writing a new script of urban development. Digital India, National Digital Urban Platform and Urban Platform for Delivery Online Governance (UPYOG) are leading to digital municipal services with speed. Multi-modal integration, last mile connectivity and e-governance are the pillars of PM Gati Shakti Master Plan. All the modes of goods and passenger transport, including buses are digitised and pooled, and adopt Intelligent Transport Systems and transit-oriented development. Both the Smart Cities Mission and Gati Shakti Master Plan are for a horizon of 5 years in place of the 20-year colonial model of Master Planning. The adoption of new technologies, such as GIS, digital blockchain, combinatorial and discrete optimisation, algorithms, complexity theory, artificial

intelligence, big data, ubiquitous cloud andhash algorithm enable speeding up the process of planning and development.

Seven Imperatives for Indian Economy

A paradigm shift is visible in the Indian budget 2023-24 approved by the Parliament in February 2023. It articulates the following 7 imperatives, viz. saptrishi, that seek to lead the Indian economy on a resilient, circular and green path of development:

- Inclusive development
- Reaching the last mile
- Infrastructure and investment
- Unleashing the potential
- Green growth
- Youth power
- Robust financial sector

The budget has emphasised on panchamrit, viz. LiFE (Lifestyle for Environment), National Green Hydrogen Mission, Gobardhan (Waste to Energy Plants), Mangrove Initiatives for Shoreline Habitats and Tangible Income (MISTI) Scheme, and Vehicle Scrapping Policy.

National urban Policy Framework

The National Urban Policy Framework (NUPF 2020) envisions urban areas with distinct identity providing ease of living, responsive governance, sustainable environment, rapid economic growth and livelihood opportunities for citizens. It envisages that the States and ULBs adopt the following core principles of Outcome-based planning and funding:

- Integrated: One City – One Program – One Fund
- People-centric: Citizens First-Project Next
- Collaborative: Promotes Partnership between Centre-State-Local Governments
- Inclusive: Open to all States and Cities
- Demand Driven: States and Cities Decide the Outcomes they want to achieve
- Based on End Results: Promotes 'Function' Over 'Form'
- Equitable: Uses Objective Formulae to Determine Funding
- Encourages Commercial Financing: Raise More, Gain More
- Objective: Independent Performance Evaluation
- Data Driven: Supports Evidence-based Decision Making
- Transparent: Public Disclosure and Citizen Engagement
- Fosters Innovation: Do More with less
- Builds Capacity: Promotes Learning by Doing
- Reorients Government Role from Driver to Facilitator

The NUPF follows a 'loose fit, light touch' approach. It aims at adoption of Circular Systems of sustainable development that strike a balance between distributed economic growth and conservation of ecology.

Circular Systems

There is an unprecedented challenge to re-establish the uterine relationship between nature and man, between consumption and production. The ecological cycle, which has been disrupted by indiscriminate economic and physical demands of development needs to be revived by exploring the possibility of creating a circular system.

It means that the processes of urban planning and development should shift to circular systems and recycling so as to conserve natural resources. It can give as much to the environment as it takes out, thus reducing the ecological impact by

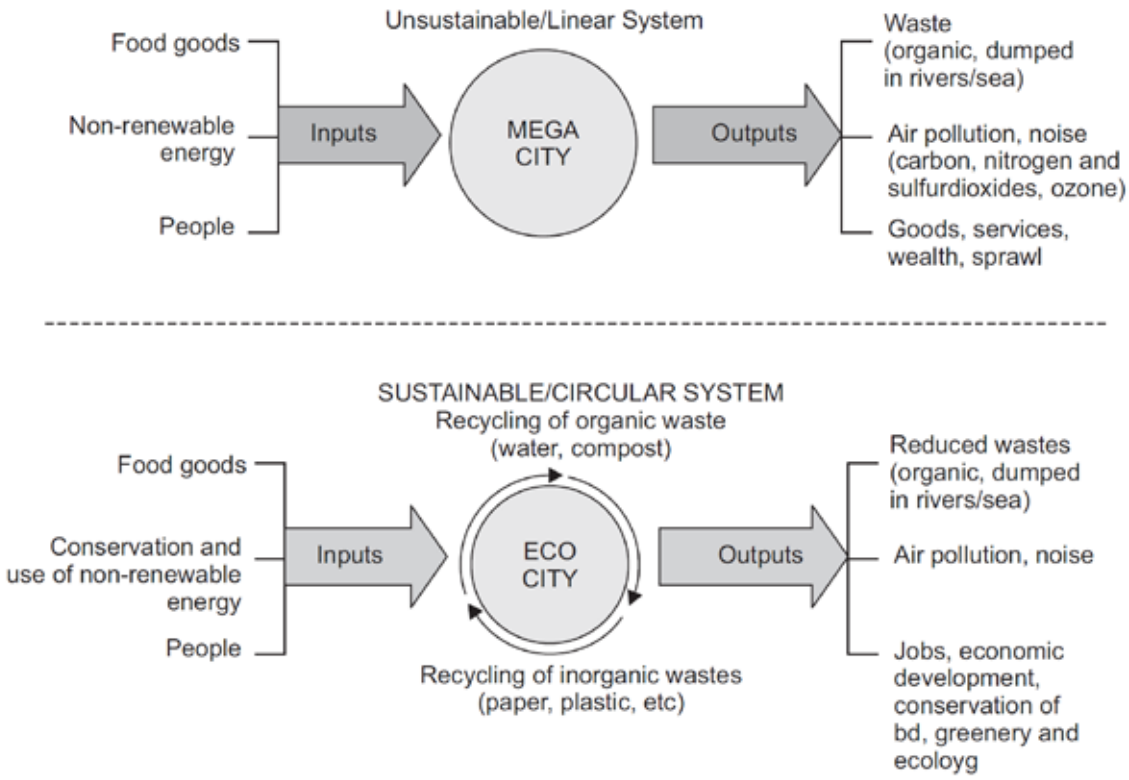


Fig. 1: City as a System

Source: Rogers, Cities for a Small Planet (1997) in UNESCO & MGIEP (2017) Textbook for Sustainable Development, A Guide to Embedding, UNESCO and Mahatma Gandhi Institute of Education, Peace and Sustainability, New Delhi

minimizing the use of land, energy, water and carbon emissions (Fig. 1).

As said by Sanjay Prakash,*'Cities show lifelike features, the whole system is more than the sum of its parts, just like living creatures, which are more than the sum of their cells and their interactions. No sub-system can be disaggregated because they all affect the overall system, change in the people of the city or in individual lives entails change in the city's economy.*

According to Aromar Revi, Rahul Mehrotra and Sanjay Prakash, who worked together on 'Goa 2100', the following are the six key takeaways in urban design:

i Use less with factor four technologies for sufficiency and equity

ii Grow your own: Tap harvestable yield autonomously

iii Build Two-way network for security. Every consumer is also a producer

iv Store renewable energy and resources

v Less transport using Least Lifecycle Cost technologies

vi E-exchange: Use intelligent wireless networks to enable real-time trade and delivery of goods.

Source: Sanjay P (1992) Energy Conscious Architecture- An Endless Quest, Architecture + Design -9 (3)

Cities have a metabolism which percolates through soil, air, materials, minerals, metals, water, agriculture and industrial products before returning to the biosphere. It is usually as an inefficient

and wasteful linear input-output system. These are turning inherently renewable systems-soils, forests, rivers and space into non-renewable systems. This profit based economic development needs to be replaced by an eco-model. The basic principles of ecology state that everything is connected to everything else. There is one ecosphere for all living organism, what affects one affects all, and there is no 'waste' in nature. Nothing comes from nothing. Exploitation of nature always carries ecological costs, and these costs are significant.

The circular metabolism gives as much to the nature as it takes out, thus reducing their ecological impact and carbon emissions by passive design with the sun, wind, water, earth and space. The sustainable built environment synthesises both the traditional culture and forms, as well as modern technology. The IPCC Report (2021) points out that growing concentration of people and activities is an opportunity to increase resource efficiency and decarbonise at scale. For the same level of consumption, a city dweller often needs less energy because of economy of scale and sharing of infrastructure and services. The economic benefits of cutting carbon pollution outweigh the costs of climate inaction. The IPCC report states that economic payback from reducing air pollution alone would be on the same order of magnitude as the investments needed to slash emissions, potentially even larger.

The IPCC suggests a compact and walkable urban area, with housing, shops and offices located close together, and green and blue networks for a sustainable landscape. The urban forests, tree-lined streets, green roofs or facades, parks, waterways help absorbing carbon and reduce the effects of urban heat island. Basins, grass verges and waterways can help to mitigate flooding and recharge the groundwater table. The old cities should retrofit their existing building stock, energy system and transport systems. These must resist the urge to sprawl and promote mixed land use, which can help them to become low or net-zero emission.

Urban Infrastructure Development Fund and Municipal Bonds

In the budget 2023-24 an Urban Infrastructure Development Fund has also been established which would incentivise the cities to improve their finances and make them ready for municipal bonds. This will encourage the urban local bodies to tap the capital market to improve their performance.

Development of a municipal bond market in India appears to be a long-term option for urban infrastructure financing. It would need considerable support of the central and state governments, framing of enabling legislation and development of an effective institutional framework. This would also help in creating a business-like work culture and a spirit of competitiveness among the local bodies in India. It also enables the municipalities in undertaking costing of services on commercial principles and to streamline the financial decisions.

Resort to long-term trends can help in raising the finances for urban development and infrastructure projects whose benefits are spread over a long-time horizon. The endeavour should be to make the municipalities credit-worthy in near future to enable to float the bonds on their own strength. This would, require that services be priced to recover all the costs and prioritise commercially viable schemes. Ahmedabad Municipal Corporation floated bonds carrying interest of 14% after creation of assured redemption funds and credit rating procedures.

Resource Constraints

In spite of several innovations in financing of urban infrastructure, the present framework in most of the Indian cities suffers from various constraints, such as given below:

- Reliance on government budgetary supports.
- Lack of expertise in financial management.
- Lack of cost recovery, financial planning, resource mobilization ability, financial control and commercial mandate.
- Capital intensive nature, high interest rates and long gestation period of infrastructure projects.
- Profit motive effecting equitable and inclusive service delivery.
- Lack of coordination in planning and implementation.
- Lack of ecological and environmental consciousness
- Lack of accountability.
- Lack of information, training, and capacity building, hindering effective service delivery.

These constrains need to be considered for financing of urban development and infrastructure. Besides Municipal Bonds, following options can be explored:

Value Capture Finance

The concept of Value Capture Finance (VCF) is based on a principle that communities benefiting from public investments on infrastructure should pay for it. The World Bank report on Unlocking Land Value to Finance Urban Infrastructure (2009) mentions multiple ways of capturing land values gains for public investment. Indian cities can pursue and implement a basket of these options to capture investments, and to achieve financial sustainability.

The Smart Cities Mission has identified six broad categories of financing:

- mission grants,
- convergence with other missions,
- own source revenues,
- public private partnerships,
- borrowing and
- others, such as corporate social responsibility.

This urban infrastructure conundrum can be addressed to a great extent through Value Capture Finance (VCF). The McKinsey report estimates that nearly 45% of the resource requirement can be met through various land and asset monetisation strategies, such as development charges, impact fees, higher building fees or setting apart a share of the land for specific uses or transferred to the local government and sale of Floor Area Ratio (FAR) or air rights.

Land Banking

The most direct value capture is for governments to build land banks through strategic acquisitions. Once a part is developed, the value of the remaining land rises and the government can capture the entire increment by selling it. This strategy can be a valuable source of financing public investments in greenfield developments. The government agency could monetise its land bank in a phased manner to finance the development of newer areas. The MMRDA and CIDCO have used this strategy to finance infrastructure development - the Mumbai Urban Transport Project (MUTP). In Bhopal government land at Shivaji Nagar (350 acres) generated enough resources for infrastructure development by putting to auction only 20-30% of developed land (70 to 100 acres).

Tax Increment Financing (TIF)

Tax Increment Financing (TIF) enables value capture from future increase in property tax or a surcharge on the existing property tax rate, which is

used to finance some new infrastructure in the area. The seed funding comes from the government and the escrowed tax-increment can catalyse its expansion. However, it requires enhancing accountability by linking expenditure with outcomes relevant to the residents.

New York City uses Business Improvement District (BID) to deliver infrastructure and other services through Public Private Partnerships (PPPs) by levy of a special additional tax on commercial property owners. The biggest BID in the United States had been the Times Square Alliance having $18 million of revenues in 2014.

Floor Area Ratio (FAR) as a Resource

Given the acute scarcity of vacant land and the adverse impact of the sprawl, it is desirable to encourage optimum use of land and densification in certain areas. This can be done by incorporating higher FAR for such areas. A two-tier FAR structure, with a certain basic FAR bundled with property right and the remaining to be purchased, can be designed to enable value capture. This has been used to subsidise in-situ slum rehabilitation, whereby 40% of land/FAR is earmarked for market sale which finances the whole project (Delhi).

Impact Fee

Impact fees are levied, apart from the development charges, on new constructions in an area where a large new public investment such as major roads and highways, metro rail, industrial corridors, ports, airports, and other public infrastructure is undertaken.

They are used to finance specific large new infrastructure projects and not basic civic utility services. An example of impact fee is the levy on new developments within the 1 km wide Growth Corridor (GC) on both sides of the 162 km Outer Ring Road (ORR) around Hyderabad. The impact fees were higher for the part of the corridor within the ORR and for commercial use. It increases with building height. However, there had been a wide gap between the estimated and actual recovery.

Air Rights, Infrastructure Investment Trust, EPC Contracts, and Transit Oriented Development

In densely built-up cities, where land is scarce, much space is locked under the railway yards and stations. In such cases, air rights can be sold to enable efficient utilisation of scarce urban space, besides generating revenues for the railways and local government. The most famous examples of such air rights allocation are the Atlantic and Hudson Yards Projects in New York City developed on old railway yards.

CIDCO has developed commercial office space above suburban railway stations in Navi Mumbai. The RLDA has taken up the redevelopment of Gandhi Nagar Railway Station with a five-star hotel. The National Monetisation Pipeline has a target of Rs 6 lakh crore during 2022-25 of which the share of the Railways is Rs. 1.52 lakh crore. Railways Infrastructure Investment Trust (InvITs) is being anchored by the Dedicated Freight Corridor Corporation (DFCC) for redevelopment of railway stations, warehousing, commercial and entertainment hubs. The budget outlay for railways is 2,62,200 crores (2023-24) under which 1275 railway stations are being redeveloped through EPC contracts. The funds have also been allocated for Rapid Train Projects, Railway Bridges, High-Speed Railway Corridors, Dedicated Freight Corridors (3581 km), Hydrogen Powered trains, Gati Shakti Units and Transit Oriented Development of railway properties.

The investments go hand in hand with digitisation of railway supply chain, artificial

intelligence, biometric token system, contactless travel, driverless train operation, head on generation system, LIDAR technology, online monitoring of rolling stock, cyber security and Kavach safety technology.

Transferable Development Rights (TDRs)

In most Indian cities the acquisition of private land for roads and utilities, open spaces, and community facility is a major problem. The tool of transferable development right is being used in some cities. The landowner is compensated with additional FAR, which can be self-used or transferred to a third party for use elsewhere in another zone (receiving zone) provided the infrastructure in the receiving zone, supports the transferred FAR. A TDR certificate is issued to the landowner and this certificate can be redeemed elsewhere. This opens up the possibility of a market where such development rights can be bought and sold. The Mumbai Development Control Rules 1991 grant the suburbs a total FAR of 2, with the base FAR of 1.0 allowed free of cost and the remaining to be purchased by developers in the form of TDR. Hyderabad has also used TDR to acquire land for widening of roads.

Land Value Tax

Land value tax is an annual tax on the increment of land value. It helps stabilise property prices, discourage speculative investments and is considered efficient. However, the absence of transparent price recovery in Indian property markets and poor state of land titles make its administration difficult. Land value tax can be a useful instrument to discourage speculative hoarding of land and force the landowners to develop the land. Though many Indian states have such a tax, it is hardly enforced.

Capital Gains Tax

Capital gains tax is imposed when the property is sold and accrues incremental value. The long-term capital gains tax rate in India is 20%.Being a Central tax, it does not endow on the local government and therefore does not contribute to local infrastructure investments. Apart from the investment made in the property, which is deductible, various other forms of taxes like development fee, impact fee, etc. are generally not deducted from the capital gains tax calculation.

Betterment levy

Betterment levy is a one-time upfront charge on the land value gain caused by public infrastructure investment. The Delhi Development Act, since 1957 provides for betterment levy, but it has not been captured. This needs various reforms, such as digitised land/property information, blockchain for transactions, legal back up and regulatory system and its enforcement.

LIFE- Lifestyle for the Environment

India and the United Nations have initiated the LiFE or Lifestyle for the Environment Mission (2022). This aims that living, production, and consumption based on mindful deliberation, and not mindless and destructive consumption. Low carbon lifestyle is a cluster of habits, embedded in a social context and enabled by efficient infrastructure that minimises the use of natural resources and generation of emissions, wastes and pollution. Creating sustainable lifestyle requires a change in social norms and rethinking the ways of living based on the principles of organic city, non-accumulation (*aparigraha*), minimalism and slowing down. It is also about caring, sharing, recycling and living in balance with the natural environment. The reuse and repair culture needs to be promoted together with education, capacity building and participation of civil society.

Conclusions

Urban India contributes about 70% to the gross domestic products (GDP)

and similar ratio of jobs. With India on a rapid trajectory of urbanisation, a major challenge is to interface the economic and ecological eco-systems. This calls for some radical changes in the processes of planning and financing that lead to an inclusive, resilient and green path of development. India with a demographic/ youth power dividend, technological advantage and a robust economy can unleash its potential. The basic approach is to adopt circular systems, factor 4 and lifestyle technologies and recognising the principle of 'less is more'. Simultaneously, there is also a need for urban financing, taxation and governance reforms.

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Inclusive Public Spaces for Resilient Economies

RINKY HALDAR

This paper on "Inclusive Public Spaces for Resilient Economies" underscores the significance of public spaces in nurturing economic resilience within urban environments. Well designed public spaces can contribute to social, psychological and economic benefits in the society. Inclusive public spaces for resilient economies must enable accessibility, diversity, inclusivity, economic opportunities, community interaction, knowledge sharing, physical and psychological well-being, and safety. These spaces foster diversity, encouraging interaction among individuals from varied backgrounds, and they promote inclusivity, addressing the needs of everyone regardless of age, gender, race, or socio-economic status. This article demonstrate the societal and economic value of public spaces when designed from the perspective of youth in India.

Key Words: *Inclusion, Sustainable Urban Development, Sustainable Development Goals, Resilient Cities, Integrated Planning, Youth Development, Youth Bulge, Youth Participation, Resilient economies*

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Introduction:

In our rapidly evolving world, the concept of resilience has taken on fundamental importance. It's not merely about bouncing back from challenges but also about fortifying ourselves against future uncertainties. One critical arena where resilience takes root and thrives is within our cities, the bustling centers of human activity and innovation.

The year 2023 has posed its unique set of trials, testing the mettle of cities around the globe. Economic growth has encountered a downturn globally, bringing it to a sluggish 2.5% (IMF, 2023). This rate of growth, except for the significant jolts of 2009 and 2020, has not occurred since 2001. In this context, the fate of nations hinges on the productivity of their urban domains, often referred to as the engines of growth (UN-Habitat, 2022).

Cities, indeed, are the crucibles where economic value is generated, and it's this value that propels growth and recovery. But for growth to be not just robust but also sustainable, cities must possess a unique quality – resilience. They must have the capacity to absorb shocks, rebound from adversity, and brace themselves for the economic and environmental storms of the future. In recognition of these imperatives, UN-Habitat initiated the Global Public Space Program in 2012. One of its central objectives is to assist governments in crafting socially inclusive

public spaces. These spaces aren't merely physical; they are where communities forge bonds and resilience takes root.

In this article, we delve into the tangible and intangible dividends of inclusive public spaces. We explore their role as epicenters for economic vitality and community cohesion. And we narrate the role of a specific set of stakeholders whose lives have been transformed by these spaces, revealing how they hold the key not just to recovery but also to sustained growth in our cities.

Urbanisation and Leveraging Youth Dividend

Urbanisation in the 21st century is undeniably the driving force propelling the world toward prosperity, and at the helm of this transformative process are the world's youth. Young people represent society's most essential and dynamic human resource. In the contemporary landscape, there are more individuals under the age of 25 than ever before, a staggering figure approaching three billion, which equates to almost half of the world's total population. Among this youth demographic, 1.3 billion falls within the age range of 12 to 24 (World Bank, 2006).These young people predominantly reside in urban centers, constituting a significant portion of urban populations. Notably, it is in the cities of the developing world where urbanisation is most pronounced, accounting for over 90% of the world's urban growth. Within these burgeoning urban landscapes, youth comprise a substantial segment of the population.

By the end of this decade, projections indicate that the influence of youth in urban areas will continue to grow. It is estimated that by 2030, an astonishing 60% of all urban dwellers will be under the age of 18 (Woodrow Wilson International Center for Scholars, 2003). This demographic shift is poised to reshape the social, economic, and cultural fabric of our cities, making it imperative that the voices, aspirations, and contributions of young people are recognised, respected, and integrated into the planning and development of urban spaces. Furthermore, a staggering 70% of the global population will be under the age of 30. This youth majority holds immense potential for innovation, creativity, and economic growth. A concerning aspect of this demographic change is that more than 70% of the population residing in slums and informal settlements will comprise young people. These areas often grapple with inadequate infrastructure, limited access to education and healthcare, and economic disparities.

In light of these statistics, it is evident that young people are not just the future but also the present. Empowering them, listening to their perspectives, and involving them in shaping the world's future are essential steps toward achieving sustainable development and inclusive societies. Addressing the needs and aspirations of youth is crucial for harnessing their energy, talents, and creativity to build a better world for all.

India's Youth Bulge

India has its largest ever adolescent and youth population. According to UNFPA projections, India will continue to have one of the youngest populations in the world till 2030. India is experiencing a demographic window of opportunity, a "youth bulge" that will last till 2025. India's youth face several development challenges, including access to education, gainful employment, gender inequality, child marriage, youth-friendly health services and adolescent pregnancy. Yet, with investments in their participation and leadership, young people can transform the social and economic fortunes of the country. With nearly one out of every four persons between the ages of 15 and 29, India has an enviable youth population (India Draft

National Youth Policy, 2021). Currently, they are estimated to constitute more than 34% of the total population. While these numbers are expected to decline in the coming years, youth will still account for almost 24% of India's population or 365 million people in 2030. Compared to countries like China, Japan, and the USA, where they face the challenge of an ageing population, India has the advantage of being in a position of strength with the potential to drive economic growth.

The youth bulge can be viewed as a demographic dividend, representing a potentially valuable economic resource. When properly educated, skilled, and employed, this youthful workforce can contribute significantly to economic growth and development. While the youth bulge presents opportunities, it also poses challenges. India must create sufficient educational and employment opportunities to harness the potential of its young population. Failing to do so could result in high youth unemployment and underutilization of human capital.

Global Landscape of Youth Challenges

The youth demographic presents both opportunities and challenges across the world. Here are key points highlighting the global situation of youth:

Youth in Developing Countries: -09 out of every 10 young people between the ages of 10 to 24 reside in developing countries. These regions often grapple with issues such as poverty, inadequate healthcare, limited access to quality education, and a higher incidence of conflict and violence. This can hinder the well-being and development of young people.

Unprecedented Youth Population: - The world is currently experiencing an unprecedented surge in its youth population. There have never been so many young people on the globe before. This demographic surge represents a unique opportunity for economic and social progress, as young people possess the potential to drive innovation, productivity, and positive change.

Realizing the Demographic Dividend: - To fully harness the potential of this youth population, governments and societies must recognise and act upon the demographic dividend. This concept underscores the economic benefits that can be reaped when a large proportion of the population is of working age and productive, provided that sufficient investments are made in education, skills development, and job creation.

Youth Unemployment: - Despite the demographic dividend's potential, youth unemployment remains a pressing global issue. High levels of youth unemployment are observed not only in developing countries but also in developed nations. This can lead to social and economic challenges, including reduced economic growth and opportunities for young people.

Efforts to address these challenges often involve policies and programs aimed at improving access to education, vocational training, and job opportunities for youth. Empowering young people with the skills, resources, and opportunities they need to succeed is essential for realizing the demographic dividend and fostering positive social and economic outcomes.

Share of Youth Not in Education, Employment or Training (NEET), 2021

The global NEET (The share of youth not in education, employment, or training)rate for young people between the ages of 15 and 24 was estimated to be around 13.9% in 2021[1]. This means that

approximately 13.9% of young people in this age group were not engaged in education, employment, or training. In developing countries, there is a notable proportion of young people who are not engaged in education, employment, or training. This phenomenon reflects a range of socioeconomic challenges.

The share of youth not in education, employment, or training (NEET) is a significant concern in many parts of the world, particularly in developing countries like India. In India, it is indeed alarming that more than 30% of the youth fall into the NEET category, indicating a substantial portion of young people facing challenges in accessing education and employment opportunities. The National Sample Survey Office (NSSO) in India conducted surveys that shed light on the NEET situation in the country; In urban areas, 27% of individuals aged 15-24 were not in education, employment, or training at the time of the survey and only 39.4% of individuals aged 15-29 in urban areas were involved in formal and non-formal education and training in the 12 months preceding the survey. Access to mobile phones with active SIM cards was relatively high, with 83.7% of individuals aged 18 and above in urban areas and 67.8% in rural areas using mobile phones in the three months prior to the survey.

These findings highlight the need for targeted efforts to address the NEET issue in India, including improving access to education and training opportunities, enhancing digital access, and creating employment prospects for young people. High NEET rates can have long-term social and economic implications, making it essential for policymakers and stakeholders to address this challenge effectively.

Cities and Communities of the Youth

Cities and communities with active youth engagement are vibrant and dynamic spaces that recognize the importance of involving young people in shaping their future. Few of highlighted characteristics of Cities and Communities with Active Youth Engagement are as follows: -

- Inclusive Decision-Making: These cities prioritise inclusivity in decision-making processes, ensuring that youth voices are heard and valued. Young people actively participate in local governance, policy development, and community initiatives.
- Youth-Friendly Policies: These communities implement youth-friendly policies that address the unique needs and aspirations of young residents. This may include support for youth employment, education, healthcare, and recreational opportunities.
- Youth-Driven Initiatives: They encourage and support youth-led initiatives and organisations that address local challenges. These initiatives range from community development projects to social enterprises and advocacy campaigns.
- Safe and Accessible Public Spaces: These cities provide safe and accessible public spaces where young people can gather, socialise, and engage in various activities. Public spaces play a crucial role in fostering community connections and promoting positive youth interactions.
- Education and Skill Development: They invest in education and skill development programs that equip young people with the knowledge and skills needed for meaningful

1 International Labour Organization (via World Bank)

employment and civic engagement.

- Youth Entrepreneurship: These communities promote youth entrepreneurship by providing resources and mentorship to young entrepreneurs. This supports economic growth and job creation.
- Cultural Diversity and Inclusivity: They celebrate cultural diversity and encourage cultural exchange and integration among young people from different backgrounds. This fosters tolerance and understanding.
- Community Safety: Ensuring the safety of young people is a priority. Strategies to reduce crime and violence, particularly in disadvantaged areas, are actively pursued.

Here, we'll explore what such cities and communities look like and the benefits of youth-led development through a case study from Nairobi, Kenya.

Learnings from UN-Habitat's Urban Youth Fund

UN-Habitat's Urban Youth Fund is one of the United Nations' longest-running

Young and disadvantaged in Kenya: The Case of the Mathare Slum in Nairobi

Kenya, with a population estimated to have reached 46 million in 2015, is projected to grow to 60 million by 2030. A significant portion of this population comprises young people aged 15-34, representing over 35% of the total population. Nairobi, the capital of Kenya, is home to a complex urban landscape that includes some of Africa's oldest and largest slums, facing multifaceted socio-economic and infrastructural challenges. Among these challenges are unemployment, insufficient waste management systems, and a growing informal housing sector.

The Mathare Slum:

Background: Mathare, situated in Nairobi, is one of the most notable slums in the city. It was established on top of a waste dump and is the second largest and oldest slum in Nairobi. The majority of its residents live in wooden and tin shacks, contributing to its high population density. Mathare is subdivided into several wards, with each ward forming a distinct community and electoral constituency. The study focuses on Mlango Kubwa, a ward within Mathare, which is home to approximately 38,000 inhabitants. Notably, Mlango Kubwa, has seen significant improvements in recent years, largely due to the efforts of the Mathare Environmental Conservation Youth Group (MECYG).

MECYG, established in 1997, started as a response to the challenges facing the community, including waste management and high youth unemployment. Over the years, the group has grown to around 40 active members and has engaged approximately 150-200 children and youth in various activities. MECYG's work has had several positive impacts on Mlango Kubwa:

- Waste Management: MECYG initiated a waste management system, employing young people to collect garbage from households. This not only improved cleanliness but also created employment opportunities for youth.
- Public Space: MECYG advocated for and built a youth center and soccer field on publicly owned land, providing a safe and accessible space for young people.
- Enhanced Security: MECYG and other youth groups addressed security issues, leading to improved safety in the community through patrolling and crime prevention efforts.

Image 1: Work Of Mathare Environmental Conservation Youth Group (MECYG)

The Mathare slum's experience underscores the importance of grassroots youth-led initiatives in addressing the challenges faced by disadvantaged communities. When young people are empowered to take action and are provided with opportunities for economic and social development, they can make significant strides in improving their living conditions and fostering positive change in their communities. The Mathare case serves as an example of resilience and community-driven progress in the face of adversity.

Image 2: Work Of Mathare Environmental Conservation Youth Group (MECYG)

Overall, cities and communities that prioritize youth engagement and development are better positioned to address current and future challenges while fostering a sense of ownership and belonging among young residents.

youth programs, designed to support youth-led initiatives focused on urban development and community improvement. Over the years, this program has yielded valuable insights and learnings:

1. Youth-Led Development: - The Urban Youth Fund promotes a youth-led development approach. It recognises the creativity, innovation, and agency of young people, positioning them as active contributors to community development rather than passive beneficiaries of aid.
2. Bottom-Up Approach: - By supporting youth-led initiatives, the fund emphasises a bottom-up approach to development. This approach empowers young people to identify and address local challenges and solutions, ensuring that interventions are contextually relevant and sustainable.
3. Economic Empowerment: - Adequate funding for youth-led development can result in the creation of viable businesses and social enterprises. These initiatives contribute to self-sustainability, job creation, and economic growth while fostering peer-to-peer support and strengthening social capital and trust.
4. Innovation and Effectiveness: - The Urban Youth Fund serves as a laboratory for testing and identifying innovative and effective practices for youth-led empowerment. It encourages experimentation and learning to discover what works best in different urban contexts.
5. Input to Normative Work: - The fund provides valuable input to UN-Habitat's normative work on youth empowerment and sustainable urban development. The insights gained from funded projects inform policy recommendations and guidelines, contributing to better practices in urban planning and governance.
6. Access to Resources: - Participating youth-led initiatives gain access to essential resources such as working space, land, materials, and equipment. These resources are critical for implementing projects and scaling up their impact.
7. Capacity Building: - The fund supports capacity-building initiatives focused on job creation and entrepreneurship. It equips young people with the skills and knowledge needed to develop and manage their projects successfully.
8. Community Collaboration: -Funded projects often involve collaboration with local communities, fostering cooperation and mutual support. This strengthens community ties and encourages collective action.
9. Youth Networks: - The program encourages the development of youth networks, discussion forums, groups and resource centers. These platforms facilitate knowledge sharing, peer learning, and collaboration among young people and their communities.
10. External Partnerships:- Engagement with external partners, including governmental and non-governmental organisations, is vital for project success. The Urban Youth Fund enhances partnerships and external funding opportunities, expanding the impact of youth-led

initiatives.

11. Sustainable Employment: - The fund's support for youth-led social enterprises and businesses contributes to the creation of sustainable youth employment. It aligns with the goal of reducing youth unemployment and underemployment in urban areas.

12. Inclusive Development: - By focusing on youth-led initiatives, the fund promotes inclusive development that considers the needs and aspirations of young people from diverse backgrounds, ensuring that no one is left behind.

In conclusion, UN-Habitat's Urban Youth Fund demonstrates the transformative potential of youth-led development initiatives. By providing resources, capacity building, and support for young entrepreneurs and activists, the program empowers youth to address urban challenges and contribute to the sustainable development of their communities. It offers valuable lessons on how to engage and invest in youth for the betterment of cities and societies.

Benefits of public spaces for youth

Public spaces provide a multifaceted environment that contributes positively to the lives of young people. They offer opportunities for physical and mental well-being, social interaction, skill development, and community engagement, ultimately enhancing the quality of life for youth and the communities they belong to.Here's a closer look at these advantages: -

1. **Economic Benefits:**

- Job Opportunities: Public spaces can create employment opportunities for young people. They can find work as park attendants, event organisers, or in various roles related to the maintenance and management of these spaces.
- Formal and Informal Economic Activities: Public spaces often serve as venues for both formal and informal economic activities. This includes the operation of food trucks, artisan markets, pop-up shops, open workshops, and more, allowing youth to start or run businesses.
- Community Economic Activities: Public spaces can stimulate economic activity within the community, benefiting local businesses, entrepreneurs, and artisans.

2. **Social Benefits:**

- Reduced Spatial Inequalities: Inclusive public spaces can help reduce spatial inequalities by providing equal access to recreational and economic opportunities for youth across different neighborhoods and backgrounds.
- Improved Community Interactions: Public spaces encourage community members, including youth, to interact and build social bonds, fostering a sense of belonging and unity.
- Knowledge Sharing: These spaces often serve as hubs for knowledge sharing, whether through workshops, cultural events, or informal gatherings, providing opportunities for youth to learn and grow.

3. **Psychological Benefits:**

- Reduced Depression and Anxiety: Access to public spaces and engagement in activities can reduce feelings of depression and anxiety among youth. These spaces offer a respite from daily

stressors.

- Increased Physical Activity: Public spaces with recreational facilities encourage physical activity, promoting better physical and mental health among young people.
- Improved Safety: Well-maintained and vibrant public spaces help reduce crime rates and the fear of crime, enhancing the overall safety and well-being of the community.

Inclusive public spaces indeed play a vital role in fostering economic development, social cohesion, psychological well-being, and inclusivity for youth, making them valuable assets for communities and cities.

Economic resilience, especially in the context of youth-led initiatives in public spaces, can have a significant positive impact on both individuals and their communities. Here are specific examples of economic resilience initiatives:

Food Trucks: Example: The story of the 20-year-old Vadodara boy who set up a street stall and received support from the internet demonstrates how young entrepreneurs can start businesses, like food trucks, that not only provide economic opportunities for themselves but also add vibrancy to public spaces. Food trucks often offer unique and affordable dining options, attracting customers and contributing to the local economy.[2]

Image 3: Youths with special needs run mobile food truck.

1. Artisan Markets: Impact: Artisan markets provide a platform for local artisans and craftspeople, including youth, to showcase and sell their handmade products. These markets not only promote economic self-sufficiency but also preserve traditional crafts and cultural heritage.

Image 4: Unnao's model for transforming Art into Sustainable Livelihoods

2 https://www.ndtv.com/food/20-year-old-vadodara-boy-sets-up-street-stall-internet-gives-full-support-4374853

2. Pop-Up Shops: Example: Pop-up shops, like street stalls, can be set up by young entrepreneurs in public spaces. They offer a flexible and temporary retail model, allowing youth to test their business concepts, connect with customers, and generate income.[3]

3. Open Workshops in Public Spaces: Impact: Public spaces can host open workshops where young people can teach or learn new skills, from arts and crafts to technology and vocational training. These workshops promote entrepreneurship, creativity, and skill development.

Image 6: Youth-led movement 'Baatein Unlocked' launched across three Indian states

4. Entertainment and Performance: Example: Street performers and entertainers, often youth, use public spaces to showcase their talents. They can earn income through tips or donations from passersby, supporting their artistic pursuits while enlivening public areas.[4]

5. Eco-Friendly Initiatives: Impact: Initiatives focused on sustainability and environmental conservation, such as recycling programs, tree planting, and waste reduction efforts, can create green jobs for youth. These initiatives contribute to both economic and environmental resilience.

6. Fitness and Wellness Services: Impact: Public parks and recreational spaces offer opportunities for young fitness trainers and wellness practitioners to provide services such as fitness classes, yoga sessions, and personal

Image 5: Create temporary retail spaces for young entrepreneurs to showcase their products.

3 https://www.ndtv.com/food/20-year-old-vadodara-boy-sets-up-street-stall-internet-gives-full-support-4374853

4 https://timesofindia.indiatimes.com/india/busking-or-begging-how-india-sees-its-street-performers/articleshow/102698100.cms?from=mdr

Image 7: Provide a stage or platform for young performers, musicians, and artists, Host concerts, open mic nights, and artistic showcases.

Image 8: Community and youth led action climate change and conservation.

training. This not only promotes healthier lifestyles but also creates income-generating opportunities for youth.

7. Technological and Digital Services: Impact: Public spaces equipped with technology hubs, free Wi-Fi, and digital services can serve as centers for digital skill development and internet-based businesses. Young entrepreneurs can offer services like web design, social media management, or online tutoring.

8. Community Gardening and Farming: Examples: Initiatives like urban farming, community gardens, and nutrition gardens, as demonstrated by

Image 9: Promote physical and mental well-being in the community

Aman Sharma in Delhi[5] empower youth to grow produce and contribute to food security. Surplus produce can be sold, generating income for young farmers.[6]

9. Tutoring and Lessons for Younger Kids: Impact: Young people can offer tutoring and lessons to younger children in public spaces, providing educational support. These initiatives not only help younger students but also create opportunities for youth to earn income through teaching.[7]

These examples illustrate how public spaces can serve as fertile ground for youth-led economic initiatives that enhance resilience, foster entrepreneurship, and contribute to the economic well-being of both individuals and their communities. They demonstrate the potential of youth to create economic opportunities and positively impact their surroundings. Our cities must prioritise developing and investing in vibrant public spaces to stimulate local economic development and provide spaces for youth to unleash their potential as contributors to a thriving society.

5 https://www.thebetterindia.com/307010/aman-sharma-delhi-teenager-grows-urban-jungle-terrace-garden-birding-wildlife-climate-change/

6 https://www.orfonline.org/research/nutrition-gardens-a-sustainable-model-for-food-security-and-diversity-67933/

7 https://www.unicef.org/india/stories/greening-blues-my-journey-young-changemaker

Light Gauge Steel Framed (LGSF) system –Alternate Building Technology used in Multistoried Structure

Project Cost : Rs. 59.18 crore
Loan Amount : Rs. 51.00 crore

The Planning & Development Authority (PDA), Manipur was awarded the contract by the Government of Manipur to build 180 government quarters on the existing unoccupied parcel of land of National Games Village (NGV) at Imphal, Manipur. The project was taken up with HUDCO's financial assistance to provide alternative housing to the current residents of Tribal Colony in New Checkon, Imphal.

Facade of Alternative Housing Project at NGV, Imphal

Since the quarters had to be made ready for occupation in a short span of time, Pre-Engineered Steel Structures (LGSF/ Hybrid Steel Structures) was chosen as the technology for construction. This ensured quicker implementation and better quality control. The structural system is a Light Gauge Steel Framed (LGSF) system with 1.15 mm thick Galvalume frame, EIFS cladding on external side and two layers of fibre cement board cladding sandwiched with insulation on the internal side. Galvalume trusses along with coloured metal sheets is used for roofing and gypsum board is used in false ceiling. The superstructure rests on cast-in-situ RCC Plies. The structural design of the Housing has been proof checked for strength and stability by IIT-Hyderabad.

LGSF structure of building block

Internal Wall Section

CIRCULAR ECONOMY IN THE URBAN CONTEXT:
Municipal Solid Waste Management through Public Private Partnerships in India

RAMAKRISHNA NALLATHIGA

Key Words: *Circular economy; Indian Cities; Waste management; Public Private Partnerships;*

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Circular economy has been assuming a lot of importance in the recent times, when the national economies have grown to a significant size. It assumes more importance in urban areas, when cities are becoming the engines of economic growth for entire nation. City-wise or city-scale activities assume a lot of relevance in the context of managing circular economy. Solid waste management is one such activity that has a strong potential for playing a role in the circular economy of cities. Municipal solid waste management is not contextualised into circular economy and it is considered that entire waste management cycle needs to be managed entirely by municipal authority. However, the Public Private Partnership (PPP)appear to be promising towards achieving circular economy goals in Indian cities, especially with the potential for harnessing the energy (as well as material) from municipal waste in the urban context. PPP approach towards solid waste management is promising for achieving circular economy goals in the urban context and it needs to be given a push in large cities.

Background

India has been undergoing rapid urbanisation in the last several decades. The Census (2011) estimated that India had 31.16 per cent of its population living in cities/ towns based on its definition of urban area. Studies have shown that if the census definition of urban itself is relaxed India's urbanisation would have well crossed 40 per cent by then (Sridhar 2021; World Bank 2013). The current level of urbanisation would have reached or crossed 50 per cent according to the recent estimates by the UN Habitat (2022) and World Bank (2015). Higher level of urbanisation will lead to a higher material ad resource consumption and generate unprecedented levels of waste while also leading to a higher levels of emissions. It also poses the challenge of providing civic infrastructure services to the citizens and firms.

Globally, the level of urbanisation has increased from 14 per cent in 1900

to 54 per cent in 2015; it is forecasted to rise to 66 per cent by 2050 (UN 2015). Resource extraction has increased twelve-fold between 1900 and 2015 and is expected to double by 2050. Material consumption by the world cities will grow from 40 billion tonnes in 2010 to about 90 billion tonnes by 2050. It is estimated that more than two-thirds of the energy is consumed in cities, which account for 70 per cent of global carbon emissions. Cities are also the places wherein the highest amount of waste is generated. The World Bank had estimated that cities generated about 1.3 billion tonnes of solid waste per year in 2012, which was forecasted to grow to 2.2 billion tonnes by 2025 (WEF 2022).

Given the rising levels of urbanisation and its impact on planet earth, the world began to find the ways and means of addressing the associated challenges of current and future generation under the auspices of the United Nations (UN). The concept of 'sustainable development' has come in the above context as a means of achieving trade-offs between multiple development goals of the society – economic, social and environmental (Brundtland 1987). The member UN nations committed to 17 Sustainable Development Goals (SDGs), which take sustainable development concept as common agenda of nations through mutual cooperation and efforts (UN 2016). The provision of urban civic services, which includes water supply, sewerage, drainage, solid waste management, roads, streetlights, is an important underlying objective of the SDG 11, which seeks to achieve sustainable human settlements in cities. This paper is an attempt towards understanding the importance of solid waste management in the context of circular economy of cities and arguing for public private partnerships (PPP) as a means of achieving circular economy goals in the context of Indian cities.

2. Introduction

Circular economy approach aims to achieve sustainability by reshaping resource use through decoupling growth from material extraction and waste generation (WEF 2022). The concept of circular economy was conceived earlier towards achieving a world where nothing goes waste. But,it is now more comprehensive (Kirchherr, Reike and Hekkert 2017):

"A circular economy describes the economic systems that is based on the business models which replace the 'end of life' concept with reducing, alternatively reusing, recycling and recovering materials in production/ distribution and consumption processes, thus operating at the micro level (products, companies and consumers), meso level (eco-industrial parts) and macrolevel (city, region, nation and beyond) with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations."

Cities play an important role in the transition towards circular economy, as they are the places that consume 75% of world's natural resources, produce 50% of solid waste and generate 80% of GHG emissions. McArthur Foundation has set out a Universal Circular Economy Policy Goals (UCEPGs) framework for the cities, governments and businesses that align ambition and creation a common direction for the travel towards circular economy. Figure 1 shows the circular economy policy goals set out by it.

Figure 2 shows the broader approach and strategic elements of circular economy in the wider context. The application of circular economy holds more promise in the context of cities, where 80 per cent of the global GDP (and more than 60 per cent of Indian GDP) is generated. Densely populated

Figure 1: Universal Circular Economy Policy Goals (Source: Surgenor, 2022)

cities operate in resource constrained environment, wherein implementing circular practices can result in immediate visible benefits, such as costs savings in private sector. However, such practices can only come through the efforts of all stakeholders operating at various levels – cities, regions and nations. It also requires institutions prevalent at various levels such as appropriate legislations and acts, regulatory policies and strategies, planning and law enforcement agencies, and interested civil society groups.

Circular economy is focused on the minimisation, reduction and removal of "Waste" as a major health hazard that affects the people's right to a safe life. In the context of cities, it includes all forms of waste — municipal, bio-medical, e-waste, or industrial – that needs to be treated and disposed off carefully; otherwise, they become a threat to the public health and environment. An average Indian generates 0.3 to 0.6 kg of waste per day (NEERI 1996) whereas an average American generates 2 kg of waste per day. The nature of waste generated in Indian cities is different from those of industrialised, high income countries. Municipal Solid Waste (MSW) in India includes wastes generated in commercial and residential areas of cities excluding industrial hazardous wastes but including bio-medical wastes.

In developing countries, large investments are made to improve the delivery of solid waste management services, but they lack sufficient plans for reducing and segregating waste at source, insufficient allocation of funds for waste processing/treatment and disposal. The presence of a large informal sector and unregulated markets

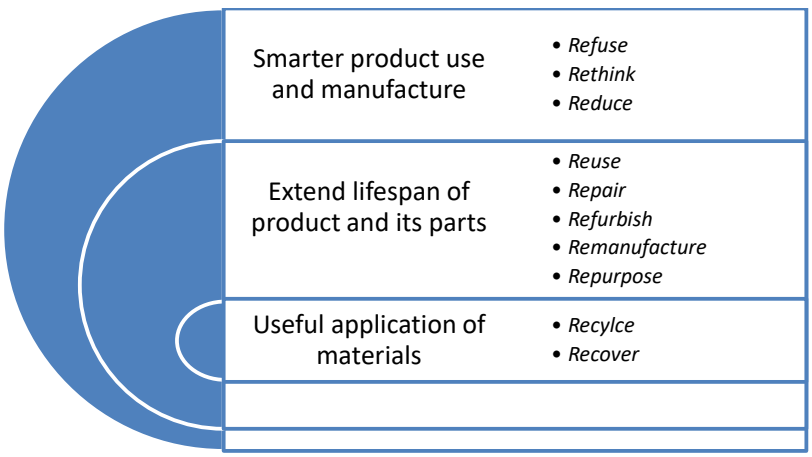

Figure 2: Strategic elements of Circular economy (Source: Based on WEF 2022)

for recyclables have led to a minimum utilisation of capacities and poor service delivery systems. On the contrary, during last two decades, high-income countries have taken up recycling as an integral part of their waste (and resource) management systems, and have invested heavily in both physical infrastructure and public communication strategies to improve their processing and disposal capabilities. Urban areas, in particular, have high waste generation, incomplete segregation at source and poor disposal systems in India, which result in poor MSW service in the cities.

3. Municipal Solid Waste Management in India

The responsibility of solid waste management lies with the Urban Local Bodies (ULBs) due to the public and local nature of service. The composition of Municipal Solid Waste (MSW) at generation sources and collection points in India is observed to mainly consist of a largely organic (40 – 60%), ash and fine earth (30 – 40%), paper (3 – 6%) and plastic, glass and metals (each less than 1%) (GoI 2009). With most cities/towns growing rapidly, there is a shift in the quantity as well as the quality of waste generated, which in turn contributes to a rising demand-supply gap for MSW services, given the limited capacity of ULBs to render the MSW service. It is the lack of capacity that requires some major innovations in addressing MSW problem in Indian cities - technological, managerial and organisational. Figure 3 shows the MSW Management(MSWM) cycle (or, MSWM Value Chain)in Indian cities.

The segregation and storage of MSW at source i.e., household or firm, is less practiced in Indian cities; the decomposable and non-decomposable wastes are often disposed of at a common communitybin. The MSW collection efficiencies are also poor, at around 70% in most Indian cities, and continue to be predominantly use manual operation. As MSW collection and transportation activities constitute approximately 80-90% of the total budget of MSWM, it forms a key component that determines the economics of MSWM system. Further, waste disposal and treatment is an under invested area, resulting in open, uncontrolled and poorly managed landfills as common feature across most Indian cities.

The framework for Municipal Solid Waste Management (MSWM) in urban areas was created by the Ministry of Environment & Forest as MSW (Management & Handling) Rules, 2000 under the Environment Protection Act, 1986.The MSW rules are

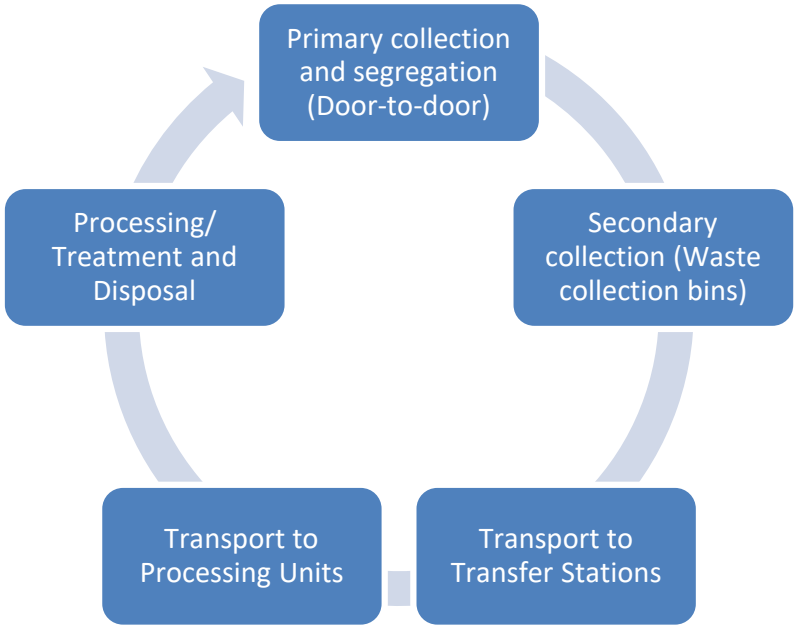

Figure 3: MSW Management Cycle
Source: Own

aimed at developing waste management practices that are safe and environmentally sound (GoI 2009). They entrusted the ULBs with the responsibility of MSWM. The rules do not allow mixing bio-medical and industrial waste with MSW. Waste generators are responsible for avoiding waste littering and also for ensuring the delivery of MSW service in accordance with the collection and segregation notified by the ULBs. The ULBs need to undertake awareness campaigns for source segregation of MSW. But, they prohibit manual handling of wastes. The storage facilities set up by municipal authorities shall be daily attended for clearing the wastes.

According to the MSW rules, municipal authorities shall adopt suitable technology or combination of such technologies to make use of wastes so as to minimize burden on landfill e,g, composting, incineration, etc (Athena 2019). Land filling shall be restricted to non-biodegradable, inert waste and other waste that are not suitable either for recycling or for biological processing. The ULB shall undertake phased programme to ensure community participation in waste segregation. Central government has enhanced funds to support ULBs towards improving their MSWM. The JNNURM and Swachh Bharat Abhiyan are two major Central Government grant schemes that partially fund the MSW programmes of the cities. Now, the Smart Cities Mission also provides some funding assistance. Figure 4 shows the institutional framework of the MSW management in India.

4. Centralised and Decentralised Waste Management Approaches to MSWM

4.1 Centralized Approach

Under the centralised approach towards waste

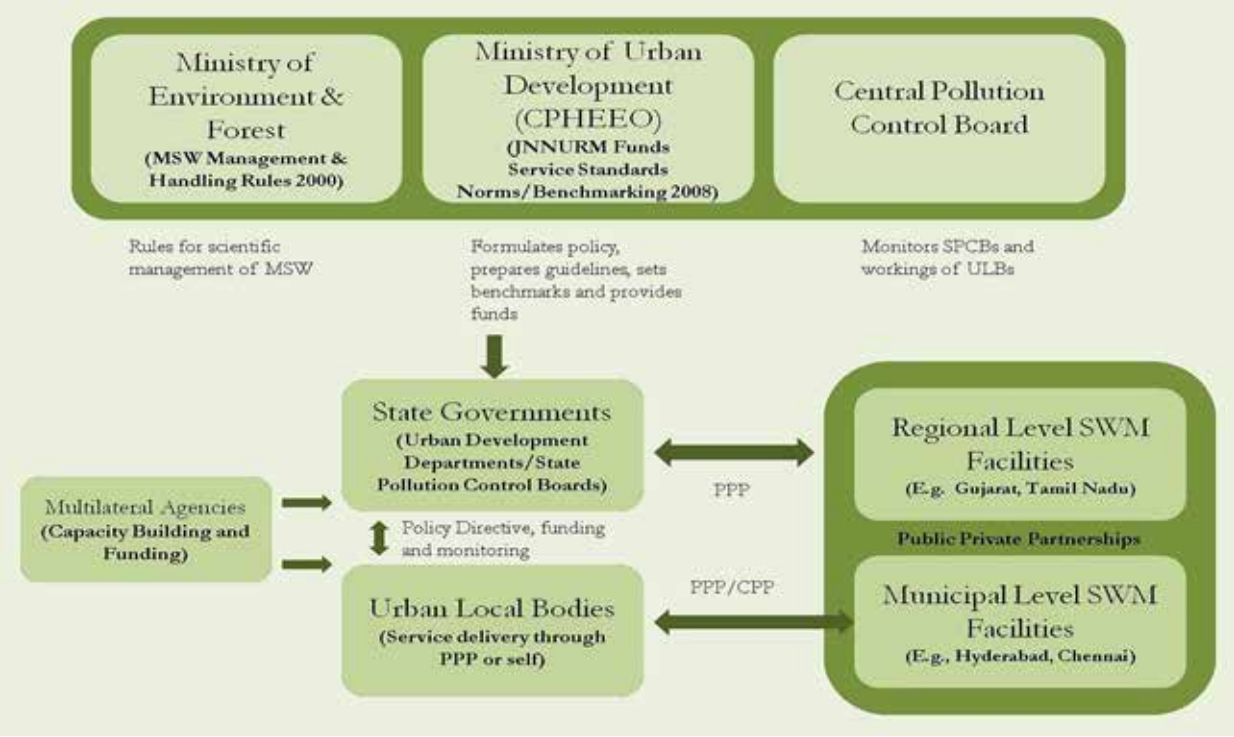

Figure 4: Institutional Framework for MSW Management
Source: Athena (2019)

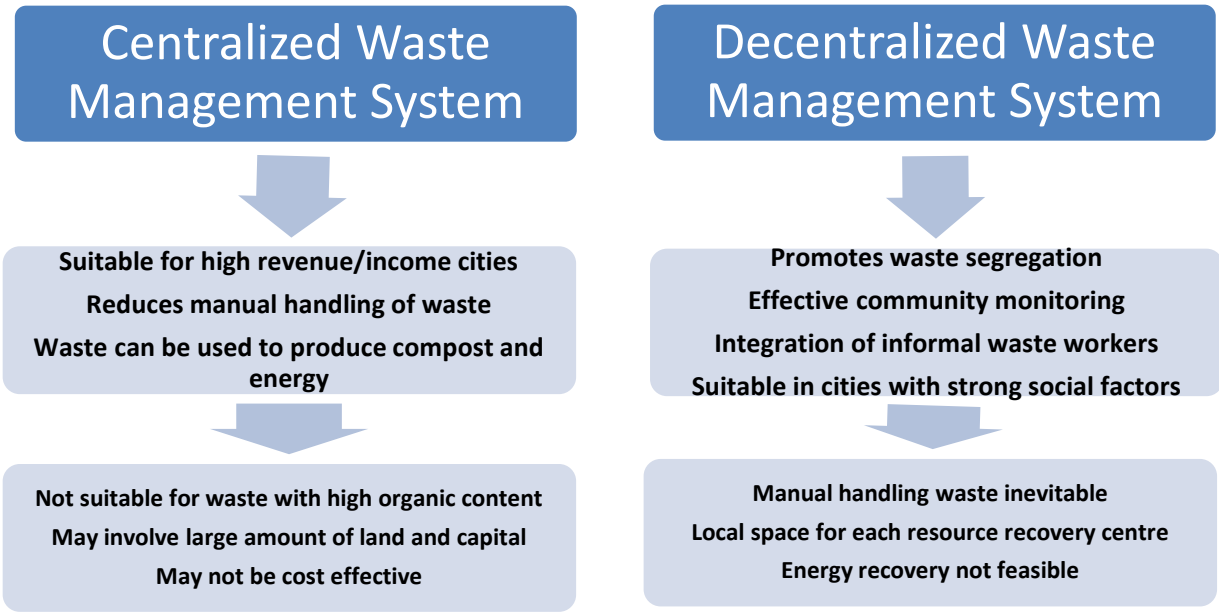

Figure5: Features of Centralised vs Decentralised SWM

management, also termed as Integrated Solid Waste Management (ISWM), technology takes central place in the waste management system for handling bulk solid wastes at a central processing facility. An ISWM covers entire MSWM cycle i.e., waste collection, transportation, processing and disposal. In such approach, the implementing agency (either the ULB or a private entity) collects waste from either households or community bins and transports it to a processing facility, where the useful recyclable/ reusable elements of waste are separated. The processed waste is then taken to an off-site plant for subjecting it to treatment (which depends upon the type of technology deployed that involves either composting or incineration or a combination) such that it results in energy/power generation as well as material recovery from waste for reuse. Hyderabad and Guwahati are two such cities where an ISWM systems are already in place.

4.2 Decentralised Approach

The decentralised approach towards waste management involves setting up various waste management centers, also known as Integrated Resource Recovery Centres (IRRCs). IRRCs can be managed by either profit-making or not-for-profit organisations that engage in waste collection, transport and processing in a small to medium locality (with handling capacity of about 2-20 metric tons).Waste management system is based on door-to-door waste collection and involves households' segregation of waste. Resource Recovery Center (RRC) serve approximately 1,000 households and have a treatment capacity of 2-3 tons of waste per day. Chennai, Bengaluru and Saharanpur are few cities which experimented with decentralised systems. Figure 5 draws a comparison of both approaches to MSW management.

5. Public Private Partnerships in MSWM in Indian Cities

The Government of India

seeks to involve the private sector in the process of infrastructure development towards turning the country into a $ 5 trillion economy. Public Private Partnership (PPP) is vehicle through which the private sector can be engaged by the public sector/ government in the provision of infrastructure services, which are hitherto provided by the government (World Bank 2006). The financial constraints and technical deficiencies of government in meeting the larger economic development agenda through infrastructure development are now well acknowledged. Accordingly, it came up with the PPP Policy in 2006 that encourages the central, state and local governments to involve private sector in infrastructure development, operations and maintenance. It encourages the participation of private contractors and infusion of private capital in the MSWM cycle (or, value chain). Private participation in the provision of MSW services is not new to India and some cities have employed private contractors for some elements of MSW cycle/ value chain. Table 2 shows the experience of PPP in the various stages of MSW cycle/ value chain.

The above table gives some details of private sector in MSWM in Indian cities. However, the private sector engagement is confined to few elements of MSWM cycle and not comprehensively for the entire value chain, which reflects some complexity at ground level in implementation. Despite the rising importance of the PPPs in the management and delivery of MSW services, there are issues of institutional framework, governance (coordination) and regulation, which are yet to mature. Further, the market linkages for recyclables/compost are still in developing stage, which make it challenging in the fiscal management of PPPs. The presence of a large informal sector in waste collection and local processing (comprising rag pickers) in Indian cities makes PPPs more challenging, as it remains outside PPP framework.

As discussed earlier, MSWM in India displays the presence of two broad approaches: Centralised (technology driven) and Decentralised (community based) systems of waste management. The choice of operational PPP model for MSWM in terms of 'Centralised' or 'Decentralised' waste management depends upon the parameters such as the composition of waste, availability of land for waste processing, local market linkages, health/

Table 2: PPPs in MSW Services of Indian Cities

MSW Service Component of PPP	*Cities*
Door to door collection	Bangalore, Ahmedabad, Nagpur, Jaipur, North Dumdum, New Barrackpore, Gandhinagar, Delhi
Street sweeping	Surat, Hyderabad
Storage and transport	Surat, Ahmedabad, Mumbai, Delhi
Treatment and disposal	Delhi, Bangalore, Coimbatore, Kolkata, Chennai, Ahmedabad
Primary collection, street sweeping, storage and transport	Chennai
Integrated Municipal Solid Waste Management (IMSWM)	Guwahati, Hyderabad

Source: GoI ADB (2019)

Table 3. shows the appropriate prevalent forms of PPP with respect to MSW value chain.

MSW Value Chain Element	Forms of PPP
Waste collection (door-to-door)	Service/ management contracts
Street sweeping	Service contracts
Community waste bins construction and operation	BOT and its variants; Separate EPC and O&M Contract
Waste transportation (to IRRP/ disposal station)	Concession and/or O&M Contract
Waste processing and treatment	BOT and its variants; Separate EPC and O&M Contract
Waste disposal system (land fill based)	BOT and its variants; DBFOT; Separate EPC and O&M Contract

Source: Adapted from GoI-ADB (2019)

environmental risks and the extent of informal sector in MSW system. Centralised PPP models are suitable for large urban areas (metro cities) where significant scale economies are possible through large scale treatment; waste composition allows for greater value generation from MSW through technological solutions. Decentralised PPP models are appropriate if the organic composition of waste is high, land for composting is available at suitable locations, market for compost is accessible, organisational capacity exists and informal workers play an important role. Large cities also have higher potential to generate own revenue (both tax and non-tax revenue) to become financially self-sufficient to manage waste in the long-run. Such fiscal strength of cities also plays a role in determining the choice of appropriate PPP model, deployment of technology and choosing the mode of private sector engagement.

5.1 Need for private sector participation

Indian cities generate 1.6 lakh tons of municipal waste every day, of which only 10 per cent is scientifically managed (Ravikant 2023). India's annual waste generation is projected to increase to approximately 260 MT by 2047 from the present 42 MT (Athena 2019).Class IA, IB and IC Cities will continue to account for the bulk of the waste generated in the country (HPEC 2011).The land required for disposing waste is also set to increase in response to the increase in waste generation. land requirement for landfills has increased by 75% in a span of just 3 years from 2007 to 2010 and is further estimated to increase by 285% by 2030 if proper waste management practices are not adopted at the earliest (Athena 2019).

The ULBs in India that govern Indian cities are not able to manage the increasing quantity of waste generated in cities (though they spend a small amount of their budget on waste management). The reasons for bringing in private sector participation is primarily to leverage private sector efficiency and expertise; they can also bring-in new technology and complement with raising finance. The private sector has access to a wide range of technological alternatives that can be used for the processing of waste. However, when it comes to large cities, they need to tap the potential of PPPs in the entire value chain.

5.2 Potential for Private Sector participation

India has over 5,000 cities and towns classified broadly as urban areas. The number of metropolitan cities with population of over 1 million increased from 35 in 2001 to 53 in 2011 and is expected to increase to 87 by 2031. With increasing urbanisation and correspondingly high levels of quantity of waste generation, there is potential for adopting PPPs. Yet, few cities have ventured into PPP in an attempt to make over their waste management systems. The ULBs are under tremendous fiscal pressure and also public pressure to improve waste management and PPPs are seen as a potential means to achieve it. The government has attempted to address the lack of adequate funds with ULBs by launching the JNNURM. This was followed by Swachh Bharat Mission (SBM), which aims at clean and hygienic cities.

PPPs can leverage the public and private funding as well as other strengths of both the sectors for achieving SBM objectives and move towards PPP based solid waste management solutions. Waste is an issue of both health and environmental concern to municipal authorities, governments and particularly people, therefore establishment of functional, efficient and adequate waste management systems are absolutely essential towards more sustainable solutions. Public and private players have greater roles and responsibilities in this respect, including policy-making, resource mobilisation, enabling environment in order to pave the way for more efficient and sustainable waste management systems.

6. Conclusions

Circular economy approach is gaining momentum in a world that is rapidly growing in terms of demographics and economics. As cities are the major concentrations of these people and economic activities globally (including India), circular economy has come to focus in Indian cities and their management process. Solid wastes are generated majorly from cities and their management assumes importance to avoid turning them into places of waste pile up centres. Therefore, solid waste management in cities needs a careful and well managed process and adoption of the waste management principles – Reduce, Recycle and Reuse (RRR). Here, given the financial and technical constraints of governments, the PPPs assume importance.

Indian cities generate a large amount of waste but a small amount of which is scientifically processed, treated and disposed safely. Although MSW Rules, 2000 warrant the cities to undertake the SWM seriously and diligently, they do not have adequate resources. Here, the PPPs can fill that gap. The Government of India encourages PPPs adoption in all infrastructure sectors including waste management. However, the experience of PPPs in the context of MSW in Indian cities is limited. Waste management under PPP will lead to leveraging private capital and technology as well as managerial skills. In conclusion, PPPs hold some promise in achieving MSW management and circular economy of cities.

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Accelerating Water Action Agenda for Tackling Water Crisis in Urban India

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Key Words: *Water Action Agenda, SDG, WASH, water resources management, urban India, water crisis, water security*

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Developing countries face multiple challenges related to future uncertainties and pressures related to sustainable and resilient modes of urban water management. India with its enormous population and rapidly growing economy is severely facing issues related to water availability and management in urban areas, particularly in the megacities, which is further compounded by the effects of climate change and health emergencies like COVID-19. For an inclusive and resilient urban development in India, one of the prerequisites is that the urban population has access to safe water (and sanitation and hygiene) and sustainable service delivery. In this article, we critically describe important challenges and a strategic roadmap to enhance understanding on how the resilience of water (and sanitation and hygiene) can be improved in the Indian scenario. Though, India has several ongoing policy interventions to manage water resources in urban areas, there is a need to further develop an actionable, comprehensive, integrated water policy that would entail time-bound implementation of adaptation and mitigation strategies, addressing urban water demand and supply needs under the added pressure from climate change, population growth and urbanisation.

1. The Global Scenario

The United Nations' 2023 Water Conference held in New York, during 22-24 March 2023, was a historic event as it was the *Midterm Comprehensive Review of Implementation of the UN Decade for Action on Water and Sanitation (2018-2028)*. The event was convened to urgently tackle the water crisis and set the world back on track to achieving the United Nations Sustainable Development Goal (SDG) 6 on Clean Water and Sanitation (WASH).

Globally, although considerable progress has been made in providing WASH services to urban populations, growing urbanisation and rapid industrialisation are placing massive stress on urban water resources. Small and developing cities frequently lack the financial means to provide and maintain WASH services. Further, some governments have also fallen short in their efforts to set up the necessary WASH

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infrastructure in isolated areas or those with limited access. Mostly due to a lack of access to adequate WASH data resulting in policy inaction and implementation failures, the anticipated outcomes on poverty (SDG 1) and health (SDG 3) are often affected.

The Asia Pacific region is witnessing accelerating urbanization, which means that more than 50% of the region's population will be living in urban areas by 2030. About 563 million people live in urban slums in the region, making it difficult for communities to deliver basic amenities including WASH services. Provision of adequate infrastructure for the distribution of water, wastewater, and stormwater often face considerable challenges due to the fast growth of urban centers and peri-urban areas as well as the negative impacts of the changing climate. In this context, concepts like the circular economy may provide ways to address both the water supply and sanitation challenges concurrently, such as through direct and indirect potable wastewater recycling and reuse.

The 2023 Water Conference aimed to take global-scale actions and solutions for water-related goals through multi-stakeholder participation, and focused on five key themes in line with SDG 6 Global Acceleration Framework: a) Water for Health: Access to safe drinking water, sanitation, and hygiene; b) Water for Sustainable Development: Valuing Water, Water-Energy-Food Nexus and Sustainable Economic and Urban Development; c) Water for Climate, Resilience, and Environment: Source to Sea, Biodiversity, Climate, Resilience, and Disaster Risk Reduction; d) Water for Cooperation: Transboundary and International Water Cooperation, Cross-Sectoral Cooperation and Water Across the 2030 Agenda; and e) Water Action Decade: Accelerating the implementation of the objectives of the Decade.

The Water Action Agenda (WAA) is one of the key outcomes of the 2023 Water Conference. The WAA witnessed 700 water-related voluntary commitments from member countries, governments, businesses, organisations, and other stakeholders **(SDG Knowledge Hub, 2023)**. The 77th United Nations General Assembly held that "the US$300 billion in pledges made to support the transformative WAA has the potential of unlocking at least US$1 trillion of socioeconomic and ecosystem gains". The WAA was launched in 2022, and commitments were made to accelerate the Water Action Decade 2018-2028, and the 2030 Agenda for Sustainable Development. By addressing the broad set of themes, these pledges will help build partnerships and cooperation for "urgent, immediate, and accelerated action" towards sustainable water management.

The UN Secretary-General (2022) urged countries to come together and find solutions to ensure everyone everywhere has access to clean and safe water and bring the WAA to life. Four key actions were highlighted to accelerate the water agenda, such as Closing the water management gap; Massively investing in safe water and sanitation systems; Focusing on water resilience and Addressing climate change, the SDG Stimulus plan to offset unfavorable market conditions faced by developing countries, were also discussed.

As a major outcome of the Water Action Agenda, countries across the world made several financial commitments to overcome the current challenges related to water security. Some examples include: the United States pledged US$49 billion investments for climate-resilient WASH services; the European Union plans to support WASH facility access for 70 million people by 2030; the African Union Commission aims to mobilise

US$30 billion/year by 2030 to close the water investments gap in Africa **(United Nations, 2023)**. Other than national governments, there are several other commitments made by private organizations, such as multilateral banks (Asian Development Bank's water sector investment of US$11 billion for the Asia-Pacific Region); private sector (Starbucks, Ecolab, Gap Inc., Reckitt and DuPont investing US$140 million for WASH services to 5 million people); and NGOs (World Vision investing US$2 billion by 2030 for transformative WASH services across 50 countries).

A report titled: 'Turning the Tide A Call to Collective Action by the Global Commission on the Economics of Water', pointed out states a seven-point 'Call to Collective Action' as a roadmap to convert water from a growing global tragedy to immense global opportunity **(Mazzucato et al., 2023)**. It provides a perspective for a new direction to policies and collaboration, innovation and investment, and finance, towards water conservation, water-use-efficiency, so that "no one is left behind".

2. The Indian Scenario

Indian cities and urban areas have been severely hit by the water crisis in the recent decades. This includes alarmingly rising frequency of incidences of water shortages, flooding, groundwater depletion, polluted water bodies **(Kakwani and Kalbar, 2020)**. The United Nations World Water Development Report 2023 says that around 80% of people living under water stress lived in Asia, in particular, northeast China, as well as India and Pakistan. India is expected to be the most severely affected nation by water scarcity by 2050 **(WWDR, 2023)**. A recent estimate suggests India to be the most severely affected in terms of growth in water-scarce urban population (increase of 153–422 million people) by 2050 **(He et al., 2021)**. A World Bank study estimates that India could loss 6% of its GDP (equivalent to the entire economic contribution of Mumbai to India's GDP in 2018-19) from the lack of better water management by 2050 **(World Bank, 2016)**, clearly highlighting the stress that water scarcity places on the economy and growth potential of Indian cities.

Major Indian cities that are facing issues of severe water scarcity and management include Delhi, Mumbai, Chennai, Bangalore, and Kolkata. In some cases, the issue of water scarcity has been exacerbated due to the unique geographical position and inter-state water sharing policies. For example, both Chennai and Bangalore have faced extreme water scarcity in the recent past. While Chennai faced one of its worst water crises in 2018-19, Bengaluru delayed impending water 'day zero' in 2019 by further exploiting the Cauvery River with tankers supplying water to over 50 per cent of the city. Similarly, Delhi, Mumbai, and Kolkata, though face selective water scarcity, the water availability largely depends on monsoon precipitation or supply from the neighboring states. The problem of urban water scarcity is not only limited to quantity and quality but also equity – across different segments and different sections of population. Studies have highlighted that water and sanitation state of urban slum is worse than of those living in rural India **(Vidhyadharan, 2023)**.

As per the World Resources Institute's (WRI) Aqueduct Water Risk Atlas of 2023, India is among the 25 most-water-stressed countries of the world. Between 2017 and 2021, a lack of water to cool thermal power plants had resulted in 8.2 terawatt-hours in lost energy, which was equivalent to power 1.5m Indian households for five years. **(Kuzma et al., 2023)**. India is predicted to experience two to three times greater increase in flood losses by 2030 (as compared

to 2010), and is likely to be the worst affected with nearly US$ 50 billion annual losses. Viable nature-based solutions may include conservation of mangrove cover that can reduce the impact of flooding, especially in coastal cities **(UN-ESCAP, 2022)**.

Several legislations and policies have been devised and implemented to achieve a water-secure environment in urban India. Although India has a strong policy environment for water resources management, it faces several implementation challenges related to access, allocation and use of water resources in certain regions, that impede the achievement of SDG water goals and hinders integrated water resources management.

3. Initiatives towards Water Security in India

India has committed investments of over US$ 240 billion in the water sector. Water is at the heart of Mission LiFE (Lifestyle for Environment), which India aims to encourage people to live sustainably and reduce environmental footprint **(The Economic Times, 2023)**. In this context its water management i**nterventions that are linked to the fulfilment of the WAA are discussed below:**

- ***Namami Gange***is a US$ 2.42-billion flagship programme by the Indian Government launched in June 2014 for effective abatement of pollution, conservation, and rejuvenation of National River Ganga.
- **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)** (2015) aimed to establish infrastructure for adequate robust water supply networks. *Pey Jal Survekshan* programme is currently being implemented in 500 select cities under AMRUT 2.0 **(MoEF&CC, 2021)** to assess the compliance of service level benchmarks related to quality, quantity, and coverage of water supply in cities.
- India made a US$ 50 billion commitment to provide safe and adequate drinking water to all rural Indian households before 2030. The government's **Jal Jeevan Mission** or Water Life Mission aims to achieve safe and affordable drinking water in rural households by 2024 and manage its own in-village water supply systems, and hence achieve the target of 'universal and equitable access to safe and affordable drinking water for all by 2030'.
- ***Atal Bhujal Yojana (Abhy)*** **/ National Groundwater Management Improvement** is another programme to improve and scale community led sustainable groundwater management in select water stressed areas This US$ 450.00-million-project focusses on institutional strengthening, capacity building and incentive provision for communities to ensure climate resilience **(Abhy, 2023)**.
- **The River Cities Alliance (RCA**), set up in 2021 is a joint initiative of the Ministry of Jal Shakti (MoJS) & the Ministry of Housing and Urban Affairs (MoHUA), with a vision to connect river cities and focus on sustainable river centric development. It focuses on three broad themes- Networking, Capacity Building and Technical Support. The objective of RCA is to facilitate knowledge exchange (online) for Indian cities to learn new practices and approaches for urban river management. The Alliance began with 30 member cities in November 2021, the

Alliance has expanded to 110 river cities across India.

Evidently, India has taken several actions for sustainable water management; however, more concrete, and time-bound actions are needed for better outputs. In 2023, India proposed the need for a more 'comprehensive and integrated Water Vision @ 2047' that would entail time-bound implementation of adaption and mitigation strategies, addressing water demand and supply needs. This plan will promote circular water economy by treating/reusing urban wastewater as well as reusing greywater or using it to recharge groundwater in rural areas. The WAA of India must take critical steps for fulfilling SDG 6 targets to 'Ensure availability and sustainable management of water and sanitation for all by 2030'.

4. Way Forward for India

Progress towards SDG 6 is off-track at the current rate. The UN World Water Development Report **(WWDR, 2023)** emphasizes on building partnerships and enhancing cooperation across all dimensions of sustainable development for accelerating progress towards all the targets of SDG 6 and realizing the human rights to water and sanitation. Accelerating Water Action Agenda should be a dynamic and adaptable plan that evolves with changing circumstances involving all stakeholders and prioritising sustainable water management practices. The key observations and recommendations derived from Water Vision @ 2047 and other knowledge forums shows the pathway for a water-secure future for urban India **(Water Vision @ 2047, 2023)**.

Mapping of water resources

- It is crucial to map the state of drinking water sources and take action to improve the quality and sustainability of degraded sources through resource convergence. For a better evaluation and planning of water resources, the use of geo-sensing, geo-mapping, remote sensing, and 3-D modeling may be encouraged.

Water infrastructure

- Water storage capacity needs to be enhanced, both on a large scale and small scale, to manage existing and future demand and build climate resilience.
- The construction of a piped distribution network should be encouraged to reduce water loss in the water conveyance system.

Policy and Governance

- A single water resources regulating body at the state level is needed for holistic management of groundwater and surface water resources, including managing aspects such as water pricing and reuse of wastewater.

Circular economy of water

- The treatment of all wastewater produced in urban areas and gradually reusing that treated water for various purposes, can promote circular economy in the water sector.
- The adoption of zero liquid discharge (ZLD) and thereby improving the water use efficiency in industries may be encouraged.

Priority on drinking water

- Potable drinking water may take precedence over other purposes. Regions that are susceptible to drinking water shortages should be mapped and connected to the water grid suitably.
- Drinking water quality monitoring at the household level should be prioritized.

- In March 2023, the national campaign "Jal Shakti Abhiyan: Catch the Rain" (JSA:CTR) aimed to focus and prioritise on 'Source Sustainability for Drinking Water'.

River rejuvenation

- For various river stretches, water quality assessments should be conducted on a regular basis at suitable intervals. To improve the quality of the water in the impacted areas, effective action must be taken.
- With the help of the catchment from adjacent wetlands, river health has to be managed holistically, and appropriate e-flow should be planned.

Flood management

- Dams should be subject to mandatory safety inspections and required maintenance.
- For early warning and appropriate mitigation, flood plain zoning to be implemented in all vulnerable locations.
- Appropriate measures to be recommended to effectively regulate sedimentation in reservoirs, rivers, and other waterbodies.
- It is important to promote inter-basin water transfer from flood-prone locations.

People's participation

- *Jan Bhagidari* (broad-based civic participation in governance) is key to sustainability of initiatives in the water sector involving participation of people, social organizations and civil society.
- Water budgeting and management to meet both supply and demand aspects at the town/city level needs to be taken up universally with people's participation and leadership of urban local bodies (ULBs). In April 2023,
- *Namami Gange* signed an agreement with 49 Indian Universities to inspire the younger population on water conservation and river rejuvenation.

Gender mainstreaming and inclusion

- With the growing accessibility of gender-disaggregated data, the role of women in WASH is being recognized widely.
- The Ministry of Housing and Urban Affairs of India have published the 'Gender Responsive Guidelines on access to water sources in the context of WASH in different Urban Settings'.
- India has given attention to the role of women outside of WASH, extrapolating to managing water resources. As part of JSA:CTR 2023, the theme *'Jal Shakti se Nari Shakti'* honors the important role that water has played in empowering women.

India needs a paradigm shift in managing water resources effectively and accelerate actions linked to providing safe and affordable drinking water; improving access to adequate and equitable sanitation and hygiene; promoting water use efficiency across all economic sectors; improving water quality and promoting use of treated wastewater; introducing the concept of circular economy in water sector; undertaking integrated water resources management at all levels; using community behavioral change as a tool for institutional reforms relevant for the water sector, and supporting productive water ecosystems (wetlands, rivers, forests), cooperation amongst stakeholders (especially women/vulnerable groups).

elsewhere. The authors declare that they have no competing interest. This article reflects only the authors' views, and their affiliations are not responsible for any use that may be made of the information it contains.

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U20 IN 2023

The city of Ahmedabad is the Urban 20 (U20) 2023 chair, following a handover from Jakarta, the U20 2022 chair. Through the U20, Mayors, governors and city leaders engaged with the G20 and committed to work together with national governments to move from intention to action and drafted a roadmap for global change that will be driven together with cities, closing the gap between policy and practice at all levels of governance.

The Communiqué outlines U20's vision for working collaboratively with the G20 to inspire city-level solutions to global climate, economic and environmental issues. It was signed by 105 cities. This year's U20 Summit took place amid growing global momentum to reform the world's financial system to make it fit for purpose for today's challenges. A new U20 climate finance working group will explore multilateral development bank (MDB) reforms that could help to accelerate investment in urban climate finance, and deepen collaboration between cities and the G20 Expert Group on Strengthening Multilateral Development Banks.

The 2023 U20 chair has identified six priority areas building on this year's G20 theme "One Earth – One Family – One Future" that are critical for inspiring city level actions to respond to global agendas:

- Encourage environmentally responsible behaviours
- Ensure water security
- Accelerate climate finance
- Champion "local" culture and economy
- Reinvent frameworks for urban governance and planning
- Catalyse digital urban futures

INCLUSIVE & RESILIENT URBAN DEVELOPMENT

WALKABILITY & PEDESTRIANISATION MODEL FOR PLANNING AND DECISION MAKING IN AN URBAN SPACE

AZKA JABEEN
MANAV AHUJA

With the rapid increase in a number of motorised vehicles on the road, many transportation related issues like crashes and injuries, encroachment, lower levels of Air Quality Index and Noise reduction factor, congestion etc. have grown very rapidly. Many cities around the world were recognised for their livability. However, these cities started to lose this feature, when motorised transportation were given priority over pedestrians who lost their sense of place, as many undesirable impacts came along. In return, people escaped the city's core searching for lively districts with attractive streets where the basic human activities can be accomplished, resulting in dead city centers which were left behind.

Environment, in such urban areas has degraded to the extent that people do not wish to visit these areas anymore. Due to unavailability of space and socio-economic system, one feasible way to upgrade mobility and environment in such special areas is to pedestrianise them. Pedestrianisation is always coupled with improvement and creation of effective and sufficient public-transportation facilities, pedestrian infrastructure and non-motorised transportation infrastructure. The paper assesses an integrative literature between the pedestrianisation and walkability by understanding the benefits and impacts of pedestrianisation and how the past projects of pedestrianisation have helped in enhancing the walkability in urban spaces.

The study aims to evaluate and recommend walkability & pedestrianization model for planning and decision making in an urban space.

1. Introduction

The walkability of a community has been conceptualised as "the extent to which characteristics of the built environment and land use may or may not be conductive to residents in the area walking for either leisure, exercise or recreation, to access services, or to travel to work", or in simpler terms, "the extent to which the built environment is walking friendly".

7Cs of Walkability - Connectivity: the pedestrian environment is linked; interfaced; networked. Convenience: pedestrian environment is appropriate; suitable; time-saving., Comfort: the pedestrian

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environment is protected; relaxed; sheltered; Conviviality: the pedestrian environment is pleasant; sociable, Conspicuous: the pedestrian environment is obvious; discernible; perceptible, Coexistence: the pedestrian and other transport modes can exist at the same time and place with order and peace, Commitment: there exists engagement, liability and responsibility towards the pedestrian environment.

Walkability has been recently introduced as a concept that translates the extent to which the urban environment is pedestrian friendly.

2. Concept of Pedestrianisation

Pedestrianisation is a method to convert a street or an area for the use of pedestrians only, by excluding all motor vehicles. In other words - removing or restricting vehicle access to a street or public area for the exclusive or prioritized use of pedestrians. An area cannot be pedestrianised in isolation. It is always coupled with improvement and creation of effective and sufficient public-transportation facilities, pedestrian infrastructure and non-motorised transportation (e.g. bicycle) infrastructure. Absolute Pedestrianisation is not possible in real world. Compromises have to be made in order to continue with proper functioning of urban system; for convenience of public and various government authorities and to make Pedestrianisation scheme acceptable and popular among citizens.

FIG 1: Framework of a successful pedestrian street.
Source:https://www.researchgate.net/figure/Framework-of-A-Successful-Pedestrian-Commercial-Street-Developed-by-Researchers_fig2_329131576

3. Types of Pedestrianisation

Full Time Pedestrianisation - Pedestrians have absolute priority. Vehicular access is restricted to emergency services only In this type arrival of vehicles into street is fully forbidden and usually services are provided in the rear of streets. Service vehicles may be allowed in specific period, for selected locations.

Part Time Pedestrianisation - Vehicular access is only allowed in specific periods. In order to minimize vehicular access to the area, there is no on-street parking. However, loading bays are provided for loading and unloading purposes.

Traffic Calming - Vehicles are slowed down through the use of traffic calming measures, such as speed tables, curb build outs, sharpened corners, road narrowing,

gateways, road texture, etc. to tell the drivers that they are in traffic calming streets. Also footpaths for pedestrians are extended and parking spaces are reduced as much as possible.

4. Benefits Of Pedestrianisation

There are a fair amount of benefits that accompany pedestrianisation, Pedestrianisation discourages motorised vehicle friendly infrastructure and facilities that results in discouraging car dependency and increase in dependence on public transport and Non-Motorised Transportation system. Pedestrianisation also reclaims public space for the development of infrastructure for these sustainable mode users. Hence, Pedestrianisation of an area leads to improvement in Level of Service (LOS) and speed of these mode users. Pedestrianised streets encourage face-to-face social interactions and communication that are necessary for maintaining enthusiasm and excitement in urban life. Considering the effects of pedestrianisation on physical objective environment pedestrianisation results in air pollution reduction as number of vehicles around the pedestrianised area are reduced. Pedestrianisation can reduce noise level up to 15-20 dB (A). Pedestrianisation significantly contributes to economic improvements and the most effective variable to measure this is saving on fuel, land & road infrastructure, Pedestrian and cycling facilities are less expensive to build and maintain than roads for cars. Based on the above factors the benefits of pedestrianisation can be classified into five main categories: Transportation related, Social, Environmental, Economic and Health related Benefits.

5. Indicators For Evaluation of Walkability of An Urban Space

The significance of pedestrianisation in developing countries is increasing continuously because the presence of vehicles is overcoming in cities as a result the attendance of pedestrian in urban areas becomes less and much less. Considering countless benefits of Pedestrianisation, there are some basic aspects that can be used as indicators for Pedestrianisation in an area. **Table 1 lists down indicators/parameters that can be used to assess the walkability of an area that has been pedestrianised or an area that is in need for pedestrianisation.**

5.1. Case Study 1: Pedestrianisation of Inner Circle of Connaught Place

Area of Study: The selected circular area has 400 meters (0.4 km) Radius

Approach: Part Time Pedestrianisation of Connaught Place was implemented on a pilot basis for three months. The middle and inner circular roads of CP were made vehicle-free. The government provided an effective 'park and ride 'services from major parking areas.

Plan of Action: The plan was to make CP's Inner Circle, from Block B to F, strictly pedestrian. Only the round strip of inner circle between block A was made accessible via private bikes and cars, Entry Roads in inner circle was completely barricaded. Those visiting will enter the parking lots from the sides.

Barrier: It was opposed by the shop owners and traders stating that the move of restriction of motor vehicles resulted in decrease in footfall and impact business.

Result: Since the issues that existed before pedestrianisation persisted during the period when the street was pedestrianised as instead of traffic congestion in the inner circle it was now in the middle circle & the radial roads. Because of this & the

Befefits of Pedestrianization				
Transportation Benefits	**Social Benefits**	**Environmental Benefits**	**Economic Benefits**	**Health Benefits**
Mobility & accessibility improvement	Social interaction & relations	Air pollution reduction	Increase in footfall, Sales & rent	Unpolluted air intake in respiration
Reduction in car use, congestion & parking need	Sense of belongingness, responsibility & pride	Noise reduction	Saving on fuel, land & road infrastructure	Exercise, fat/calories loss & fitness
Increase public transport & NMT use	Increase in security & safety	Micro-climate Improvement	Saving on reduced negative externalities	Improvement in metabolism & digestion
Improvement in LOS, speed & trip time	Heritage preservation and urban renewal		Income from public transit users	Improvement in nervous and psychological health

Table 1: *Benefits of pedestrianisation. Source: By Authors*

opposition by shop owners the Trial basis scheme was reversed.

5.2. Case Study 2: Pedestrianisation of Chandni Chowk Road

Area of Study: The 1.5km stretch from Red Fort to Fatehpuri Mosque.

Plan of Action: The road was divided into 5 zones – of which 1 & 5 were pedestrian walkways of width varying between 5.75m – 12.75m, 2 & 4 were 5.5m wide carriageways for Non-motorised Vehicles and 3 was 2 – 3.5m wide central verge. The maze of wires hanging overhead were removed and all lines were laid underground. In order to bring back the lost cultural significance of the place the paving on the road was inspired by the Mughal Style.

Barrier: The main concern of traders was loading and unloading of goods. This issue was solved and it was decided that the stretch will be a non-motorised zone from 9 am to 9 pm only. Post 9 pm, loading & unloading of motorised vehicles was allowed. Another issue raised by traders was that if vehicles were not allowed, the footfall might suffer.

Result: The issues faced were resolved to a significant extent. It was observed that after pedestrianisation there was an increase in sales and footfalls of shoppers, hence the Pedestrianisation

Qualitative Indicators		Quantitative Indicators	
Use Comfort	Sociability	Street Location	Sanitation Rating
Public Demand	Heritage Preservation	Typology	Vehicular Footfall
Safety & Security	Climatic Conditions	Level of Service	Pedestrian Footfall
Aesthetics	Use and Activities	Parking Demand	Air Quality Index
Hierarchy of Open Spaces	Environmental Conditions	Traffic Data/ Mode Splits	Noise Reduction Factor
Amenities : Located at Proper Intervals		Need of Public Transport -NMT	

Table 2: *Qualitative & Quantitative indicators*
Source: By Authors

of Chandni Chowk was considered a huge success.

The findings of the two case studies are enumerated in Table 3.

5.3. Case Study 3: Pedestrianisation In Honk Kong – New Urbanism Approach

New Urbanism is creating and restoring walkable, diverse, compact towns and cities that enable a higher quality of life by offering new choices for living. The Transport Department in Hong Kong has been following an environmentally friendly approach in managing traffic and more emphasis on the interests of pedestrians.

Factors Considered In Developing A Pedestrian Scheme: Pedestrian capacity and safety of the existing footways; Public demand and land use; Impact of pedestrianisation on the local traffic and the access and loading/unloading activities of the buildings in the vicinity.; Whilst pedestrianisation is desirable from pedestrian and environment standpoint, it is imperative that the design of any pedestrian scheme would not create traffic problems on other roads in the vicinity. Otherwise it would only be shifting traffic from one location to another.

Strategies Adopted
Full Time Pedestrianization – Sai Yeung Choi Street
Part Time Pedestrianization – Hankow Road

The Copenhagen's first pedestrianised zone opened in November 1962, with the main thoroughfare Strøget. Until 1962, all the streets and squares of central Copenhagen were used

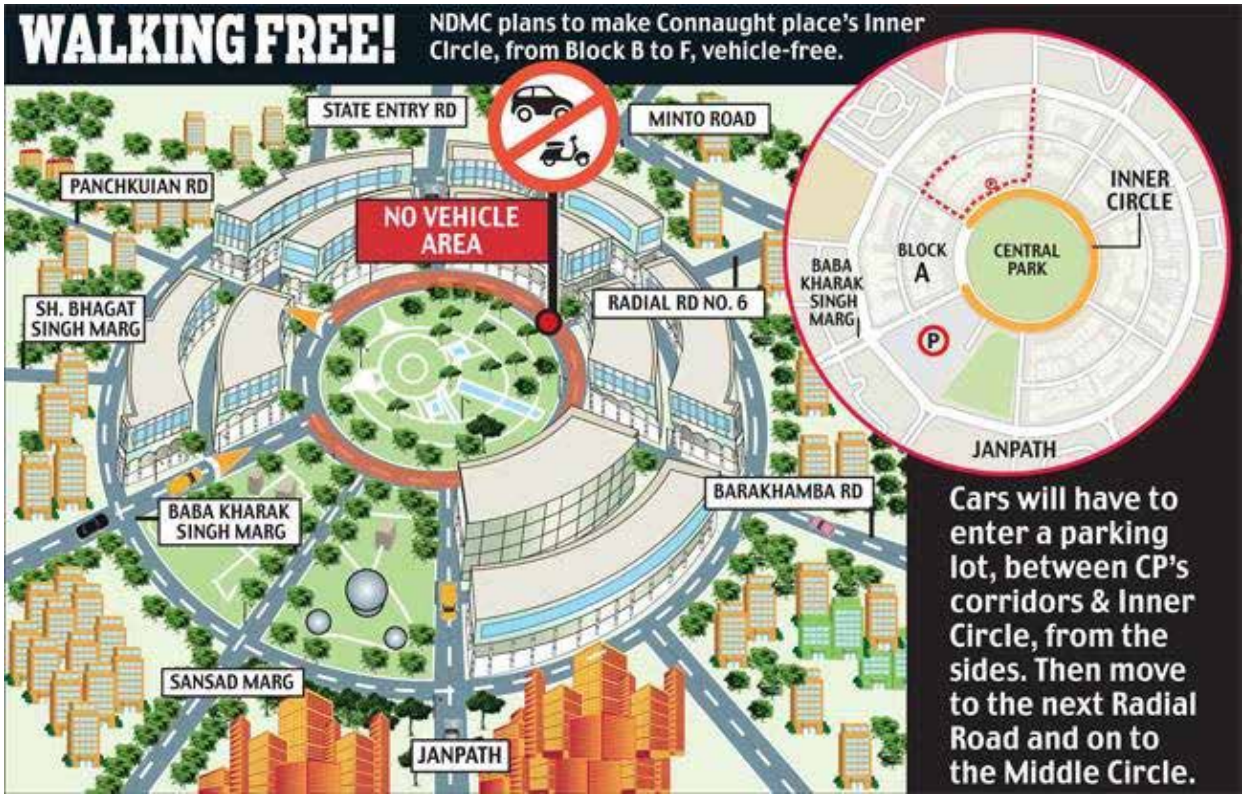


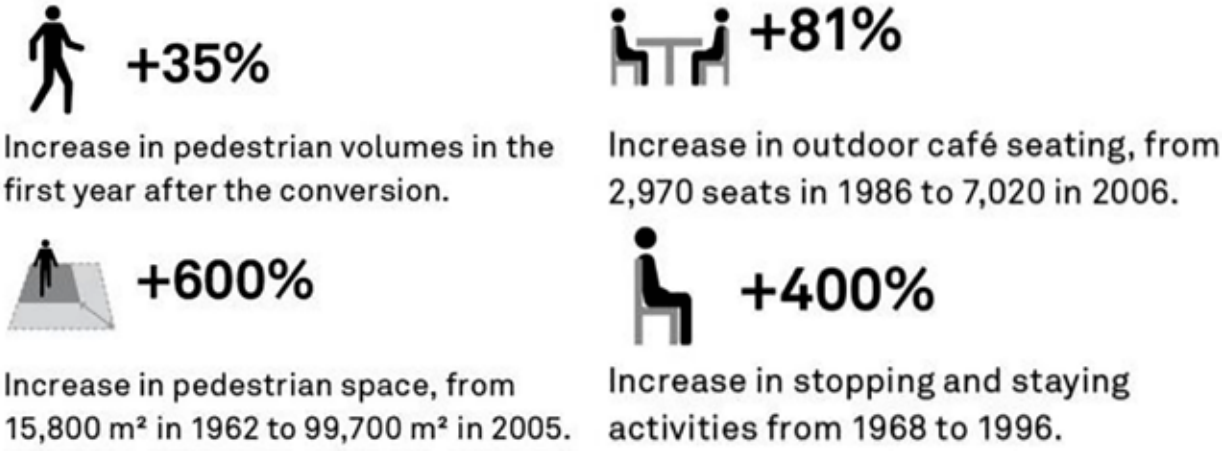
Image 1: *Plan of Action: Connaught Place walkability.*

Source: https://www.indiatoday.in/mail-today/story/ndmc-plans-to-make-cp-vehicle-free-shopkeepers-say-move-could-hit-business-314156-2016-03-21 P

Indicators	Chandni chowk	Connaught Place
User comfort	Significant Improvement was seen	Depends on User
Sociability	Increased	Same as before
Traffic	Traffic issue resolved	Traffic shift - Inner to Middle Circle & Radial Rds.
Walkability	Improved	Same as before
Parking	Proposal of Multilevel parking resolved the issue	Parking Capacity Decreased
Location/Typology	Low End - Pedestrianization Workable	High End - Pedestrianization Not Workable
Level of Service	LOS (Level of Services) Improved	Same as before
Pedestrian Footfall	Increased	Decreased
Public Transport	Dependency on public transport increased	Dependency on public transport increased
Air Quality	Improved	Same as before
Noise Factor	Decreased	Same as before
Sanitation Rating	Unsanitary conditions resolved to a certain extent	No change
Safety And Security	Eye on street concept - Safety Increased	Same as before

Table 3 - Benefits of Pedestrianization

intensively for vehicle traffic and parking. Strøget has been renewed and upgraded several times, by using progressively better-quality materials, repurposing public spaces and plazas to increase pedestrian comfort, and adding outdoor uses. A 10 step program was adopted: Convert streets into pedestrian thoroughfares, reduce traffic and parking gradually, turn parking lots into public squares, keeping scale dense and low, honor the human scale, populate the core, encourage student living, adapt the cityscape to changing seasons, promote cycling as a mode of transport.



- Improved connectivity high-quality and attractive environment
- Space that supports businesses.
- Encouraged a diverse range of people to live and spend time
- Revitalized the city's forgotten alleyways by turning them into vibrant laneway

6. Conclusion

The pedestrianisation of a street can create attractive public spaces which encourage walking and foster a sense of community. Crowds on the sidewalk mean eyes on the street. People tend to feel safe around more people. One feels a sense of belonging and connection to something bigger. Experiencing the spontaneity of city life and its associated mysteries keeps the city's flavour alive. Overdetermination of that perception can lead to disastrous effects on the human psyche. Architecture should ideally be an addition and not a substitution to the local's culture and 'nature.'

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REJUVENATING MOUNTAIN SPRINGS - A CASE STUDY OF DHARAMSHALA

DR BARSHA PORICHA, SIDDHARTH S PANDEY

Sustained collective action from all the stakeholders, supported by an enabling ecosystem has the potential to conserve and revive mountain springs to ensure water resilience and sustainable hilly habitats, like the town of Dharamshala.

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The Indian Himalayan Region (IHR) has diverse and distinctive traditional water bodies. Historically, when households were not provided with a piped water supply, the inhabitants depended on these conventional water resources, the mountain springs, locally known as Baori. They have supported the local human population and biodiversity for a very long period but are now under continuous stress caused primarily by negligence, demographic pressure and unplanned growth. The mountain springs have started deteriorating, and their productivity has also decreased. It has been observed that during the rural-urban transition of land areas (conversion of village areas into municipal regions) and as the urban administration grows, the traditional practices of conserving water are usually not carried forward, and the springs get neglected. The majority of the water flow in the non-glacial rivers during the dry season is because of the contribution of water from springs. If the springs are in danger, the hundreds of non-glacial rivers will be impacted, threatening the dependent economies and ecosystems. Developing a participatory approach with the local community and government to incorporate local knowledge and needs better is critical. This includes planning, design, demand assessment, resource mobilisation, labour, knowledge contribution, operation and management by the women and youth groups. In the long term, community ownership of the mountain springs will ensure sustainable management of the local water resources.

About Dharamshala

- District – Kangra
- Total Wards – 17
- Area of the city 27.60 km2
- Population 53,453 (2015)
- Selected as Smart City in 2015.
- It has high influx of tourists.
- Rapid population increase observed, from 30,764 in 2011 to 53,553 in 2015 (HP Gov, 2016)
- Water stress is observed in the city, demand is 7.2 MLD in Municipal Corporation Area but only 5.9 MLD is currently available (HP Govt., 2017).
- The traditional water resources, mainly small mountain springs have become redundant after provision of piped water supply to households.
- Average annual precipitation around 2900 mm (IMD)
- Only 66% of the population is covered by the sewerage network (census 2011)
- 12-16% of the population still defecate in the open (CSE, 2020)
- As per CSE estimations, 52% of the excreta is discharged unsafely to the environment while 48% is safely managed.

Dharamshala and the Water Challenge

As the city of Dharamshala,

in the state of Himachal Pradesh (HP) works towards becoming a smart city, it has experienced a sudden population surge. In response, the city administration began focusing on various city development objectives like road development and public utilities. However, amidst this, the city is experiencing water stress due to two key reasons, necessitating prioritising water management over ongoing city development plans.

Firstly, the perennial nature of streams makes these supplies insufficient to meet the city's water demand. The city is mainly dependent on perennial streams (Bather Khad and the ChauranKhad), springs and tube wells. They collectively supply 5.9 million litres per day (MLD) to the city, far below the estimated rate of demand of 7.2 MLD by the city. Specifically, as households receive an average of one hour of water supply daily, women bear the brunt as they spend a substantial amount of time and energy fetching water from distant places.

Secondly, the mountain springs, *Baori,* that recharge the rivers are drying up due to several reasons. The springs are under continuous stress due to negligence, demographic pressure, and unplanned growth. During the rural-urban transition of land areas (conversion of village areas into municipal areas), the urban administration grows in size and traditional practices that are more effective in restoring *Baoris*and meeting increasing water demands tend to be forgotten. As non-glacial rivers are usually recharged by spring waters, the drying out of springs will not only dry out rivers but also threaten dependent communities and ecosystems Established as Municipality in 1867, Dharamshala is one of the oldest Municipalities of the country. It also serves as the administrative headquarters of Kangra district and the state's second capital. Dharamshala was the first city from HP to be selected under the Smart City Mission, in 2015.

The Alternative[1]

A move towards demand-side management is one of the possible alternatives to build water resilience in the city of Dharamshala. Such a move would reduce the leakages and wastage of water in the town, thus increasing the water use efficiency. However, it would not be able to meet the growing demand as the current water supply and demand gap is very high, and it is projected to increase further. It is essential to explore other options and alternatives that could reuse and recycle waste water and could potentially support non-potable water needs such as irrigation, flushing toilets, etc. A significant limitation in adopting an infrastructure strategy is that it would require a lot of financial and economic investment, such as connecting the remaining 34% of households to the sewerage system and setting up of Sewage Treatment Plants to handle the increased wastewater volume. Added to this is the challenge of supplying water back to the households from the treatment plant against the natural gradient slope in the case of hilly regions. This would be an energy-intensive task and may not be feasible for all the locations. The administration, therefore, needs to explore decentralised and nature-based wastewater treatment systems as one of the alternatives. Another alternative that CURE has worked with that is potentially more sustainable, low-cost, and comparatively requires less time to become productive is a revival of mountain springs.

The Indian Himalayan Region (IHR) is endowed with diverse and distinctive traditional water bodies. Historically, when households were not provided with a piped

1 Dharamshala documentation2021,Rudresh Sugam

water supply, the inhabitants were dependent on these conventional water resources, the mountain springs, which are locally known as Baori, Nauwn, Kuhal, and Churudu, etc. As per a rough estimate, out of the five million springs across India, nearly 3 million are in the IHR alone. They have supported the local human population and biodiversity for a very long period but are now under continuous stress caused primarily by negligence, demographic pressure, and unplanned growth. These springs were not only a source of water but also a place of social gatherings and religious celebrations., thereby has a lot of cultural significance. Earlier the local communities used to take care of the maintenance of these springs, but after getting a piped water supply and increased reliance on the government for water supply and maintenance services, these springs have started deteriorating, and their productivity,therefore,has also decreased.

Communities shared that water quality in the springs is also deteriorating due to changing land use and due to lack of proper sanitation facilities. Much of the water flow in the non-glacial rivers during the dry season is

Pictures showing two functional mountain springs

Photo credit: CURE India Team

because of the contribution of water from springs. If the springs are in danger, hundreds of non-glacial rivers would be in danger, and thereby threatening the dependent economies and ecosystems. Thus, any initiative on the conservation and revival of springs will have multiple benefits, both temporally and spatially. A working group in 2017 constituted by NITI Aayog on "Inventory and Revival of Springs of Himalaya for Water Security"[2] also strongly recommends initiatives of spring rejuvenation across the Himalayan region for sustainable growth and building water resilience.

Drying up of springs

Springs are usually perennial. However, in the recent years, the mountain springs have been drying up. The reasons that have led to this are many. CURE's study shows that climate change and anthropogenic causes are some of the primary reasons for the dying springs.

1. **Change in land use pattern:** Deforestation in upper catchments, unplanned construction, mining, road building, tunnelling, dam construction etc., are all leading to reduced flow in these springs.

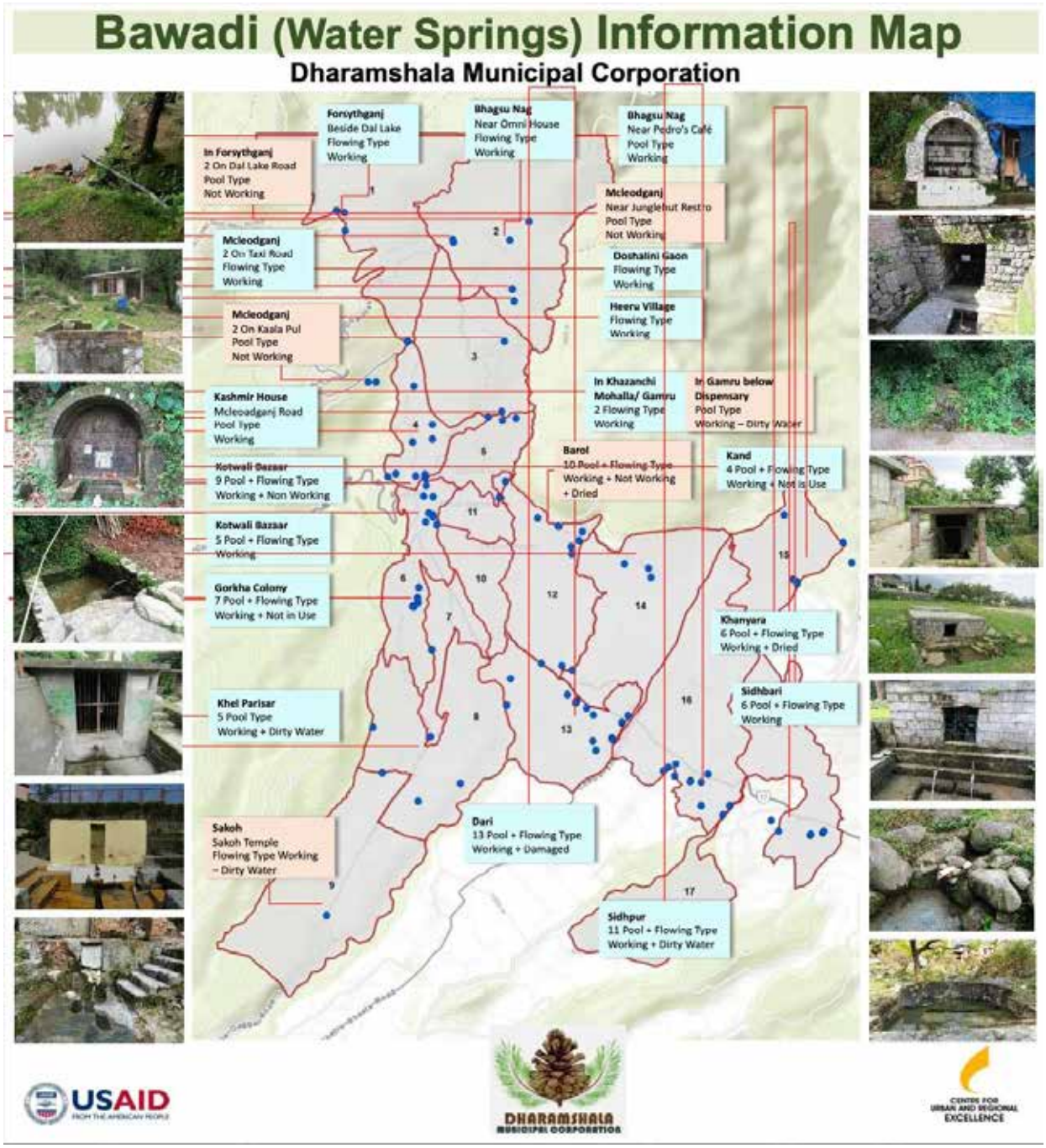
2. **Neglect by local communities:** Due to dependence on piped-water supply, local communities that used to conserve and maintain these springs traditionally are now neglecting the springs.

3. **Insufficient unders-**

2 http://dst.gov.in/sites/default/files/NITI-Aayog-report-Springs-29Dec2017-FINAL.pdf

tanding of the hydrogeology: The hydrogeology of mountain regions has not been explored much in the past. Thus, there is a lack of scientific knowledge about the flow patterns in these springs. The failure to understand springs as sources of groundwater has also led to the neglect of these water bodies during the water resources planning initiatives.

4. **Climate change:** Change in precipitation pattern is also accounted as one



of the significant reasons for springs not getting sufficiently recharged.

5. **Lack of institutional capacity:** There are limited institutes in the country working on springshed management, and a few educational institutes offer courses in this area thus, there is a dearth of skilled human resources to work on spring rejuvenation.

6. **Lack of policy support:** Springs have not been seriously considered as a source of reliable water supply. Thus, they are missing from significant water policies and planning documents.

The Dharamshala Mountain Spring Intervention

In Dharamshala, the Department for Irrigation and Public Health (IPH) is responsible for water supply and the provision of sewage system at a central level, the Urban Local Body (ULB) is responsible for the provision of these services within the settlements, and the Pollution Control Board (PCB) is responsible for controlling any pollution in the major streams. Thus, the major pipelines, treatment systems and pumping stations to pump water from streams are laid by IPH, whereas the ULB supports in provision of public taps and monitors any issue at the household level. The IPH and ULB must work in coordination for the smooth functioning of the water supply and sanitation systems. As discussed in the sections above, water availability is falling short of the total demand, and these departments require technical guidance for the revival of the springsheds to support and augment water supply in urban regions.

Table 1. Discharge Details of Some Baoris of Dharamshala

	Locational Details					Discharge Rate			
S. N.	**Landmark**	**Village**	**Ward No.**	**Ward Name**	**GPS Coordinates**	**In litres per minute**	**In litres per day**	**In lakh litres per year**	**Date of discharge calculation**
1	Near Aanganwadi	Upper Gamru	5	Khazanchi Mohalla	N 32 13′ 37.16″ E 76 19′ 36.78″	13.44	19353.60	70.64	2/14/2020
2	Near mela ground	Dari	13	Dari	N 32 11′ 54.72″ E 76 20′ 12.13″	24.72	35596.80	129.93	3/3/2020
3	Near Mela ground	Dari	13	Dari	N 32 11′ 54.03″ E 76 20′ 12.16″	42.54	61257.60	223.59	3/3/2020
4	Near mela ground	Dari	13	Dari	N 32 11′ 54.12″ E 76 20′ 11.72″	27.06	38966.40	142.23	3/3/2020
5	Near Aanganwadi	Darnu	12	Barol	N 32 12′ 52.42″ E 76 20′ 14.10″	3	4320.00	15.77	3/3/2020
6	Near Sidhpur Anganwadi	Sidhpur	16	Sidhpur	N 32 13′36.54″ E 76 19′48.51″	18.42	26524.80	96.82	2/28/2020
7	Near sidhpur Anganwadi	Sidhpur	16	Sidhpur	N 32°11′16.73″ E 76°21′03.67″	8.64	12441.60	45.41	3/28/2020
8	Near retd. Armyman house	Barol	12	Barol	N 32°12′07.65″ E 76°20′06.27″	0.3492	502.85	1.84	3/4/2020
					TOTAL			**726.22**	

CURE initiated the spring revival work in 2018- 2019[3] in Dharamshala by identifying water-related challenges and mapping Baoris in the area to support the urban water management in Dharamsala.

The intervention followeda set of activities as follows:

1. **Mapping and Documentation of all Baoris in DMC:** CURE identified and mapped more than 125 Baoris and geotagged their locations.
2. **Baoris Audit:** CURE developed a survey format for assessing essential characteristics of a Baori like location, altitude, type, ownership and management status and historical uses. In addition to these details, it is planned to estimate and capture the discharge rate of Baoris with video details. This was followed by calculating the discharge of 8 baoris in Dharamshala. The data showed that these 8 Baoris can provide 72.62 million litres of water per year if the same discharge continues (please see table 1 below). The initial findings were encouraging, and local administration recognised the significance of the initiative and the need to identify neglected Baoris with significant flows.

Water Spring Conservation Before and After

In addition to mapping and estimating discharge rate of Baoris, CURE undertook work on performing water quality analysis to understand the usability of water from these springs. This was supported with participatory community led micro planning for each Baori (highlighting water and sanitation issues, mapping the catchment, preparing plan for rejuvenation and developing some model sites for water harvesting), initiating the collection of essential Information, Education and Communication (IEC) activities to make the local community aware and part of the process from the beginning and based on study findings support the necessary policy reforms for revival of springs in Dharamshala.

Intersectionality and Impacts

With the support of local administration, this initiative was scaled up, and an informed decision was made on water resources management planning in the city. Project Dharamshala's full range of interventions has directly benefitted over 100 households (about 500 population) with economic, ecological, health and social impacts. Audits reflect that *baoris* with significant flow will then be redirected to homes through pipelines. This water source is available for non-portable uses (washing) and portable uses (drinking). Tapping on such natural sources sustainably has helped to alleviate the city's water stress. Water springs have reduced the demand for and pressure on groundwater supplies by an estimated 15%. Consequently, there is reduced energy consumption from groundwater pumping and booster pump requirements for household water supplies.

3 PASS project supported by USAID

This helps to avoid carbon dioxide emissions, reduce street flooding, allow the groundwater to recharge, and green the environment.

On the city scale, the city is expected to enjoy potential savings of approximately Rs. 1000000 Lakh (US$1.2 trillion) from the energy savings. This financial resource can then be redirected to other development needs. On a smaller scale, access to good quality drinking water has translated to reported monthly savings of Rs. 100 (US$ 1.22) per household on buying low-quality water and Rs. 200 (US$ 2.44) medical expenses for gastrointestinal treatments. There is also potential for job creation. As these are old water springs that are built with traditional knowledge, training sessions on the construction and conservation of these water sources can be conducted. Finally, these water springs can be connected with agricultural farmland as an excellent irrigation source, benefitting farmers' livelihoods and crops.

Way Forward - A Water Resilience Framework for Dharamshala

Water springs are great alternative water sources for any community and government. Despite an estimated 10 512 traditional water sources available in Himachal villages, it was found that only 30.41% of the water sources are recharging properly. This suggests significant potential in upscaling this project in terms of providing the local government with the technical expertise to identify, study and revive these water sources. Additionally, as springs are strictly controlled and managed by the government, related work has been carried out by them without community involvement and the contribution of local/ indigenous knowledge. Developing a participatory approach with the local community and government to better incorporate local knowledge and needs is critical. This includes areas such as planning, design, demand assessment, resource mobilisation, labour, knowledge contribution, operation and management by the women and youth groups. In the long term, we aim to facilitate the community to take over to ensure sustainable management of the local water resources.

The framework[4] suggests short (0-2 years), medium (2-5 years) and long (> 5 years) term ideas that a hill urban settlement can refer to in its quest to become water resilient.

Short-term interventions

Collection of site-level precise information: GIS mapping, discharge and water quality analysis of these springs are the foremost steps to be taken. Biannual/seasonal change detection of both discharge and quality could then be easily performed by the local institutions. A desktop-based land use change analysis can be performed using GIS tools.

Assessing demand and public perception: Household-level surveys are needed to understand the level of dependence of households on the springs and gauge the reasons behind their negligence towards these water bodies. This activity would also provide a comprehensive understanding of the water use pattern, overall demand and extent of water scarcity. Focussed group discussions with women, low-income group households and people dependent on distant sources of water supply is essential to understand the time and effort they are putting in getting access to water and their willingness to contribute to springshed management initiatives. This survey should also aim to understand the water usage patterns in the past and the change in discharge patterns and quality of the springs.

Defining priorities: Based on the activities above, springs

[4] Dharamshala documentation 2021, Rudresh Sugam

which have the potential to support the maximum number of households, particularly vulnerable communities, should be prioritised for rejuvenation activities.

Understanding hydro-geology: Scientific understanding of the springshed is essential for the optimisation of resources and determining the precise course of action to be taken for the rejuvenation of a particular spring. Experts working in this field could be consulted for carrying out this activity.

Formation of an action group: An action group combining springs connected through the same water network could be formed. The action group in addition to community representatives, should also comprise requisite experts, NGOs and local-level officials from water supply department.

Medium-term interventions

Initiating spring rejuvenation mission at the state level: To understand the full potential of available springs, the state government should conduct a comprehensive study and regularly update data. This would require dedicated resources, both technical and financial, for such an initiative. Thus, initiating a mission could help in continuous support of local-level initiatives and develop a repository of information for future actions at the state level.

Formation of a local task force: A locally embedded committee comprising of local, national and international experts from fields such as hydrogeology, GIS, urban planning, water resources management, social sciences etc., should be formed to support the mission by conducting regular field level initiatives, discussions, presentations, cross-learning from other states and countries etc. The role of this task force can be to oversee and support local-level initiatives on a regular basis. They could also help find alternative spring rejuvenation processes, thus optimising costs and resource requirements. NGOs and social organisations should also be made an integral part of the task force as their understanding of social dynamics and organising skills is integral to spring water management.

Long term interventions

Creation of a dedicated Himalayan Regional Institute: A dedicated institute could help to further springshed management initiatives. This institute can support by providing training on spring shed management to officials (from the water supply and irrigation department), NGO representatives and volunteers. Such institutes could also be made responsible for regularly publishing information on recent developments inspringshed management and could also act as go-to institutes for anyone seeking information on such initiatives.

Introduction of courses on springshed management: To create long-term awareness in the local population about the significance of springs in supporting human and ecology, courses could be introduced in the education curricula at higher levels.

Creation of dashboard: For transparency of fund allocation, dispersal, and utilisation and for providing updated information on initiatives being undertaken under the Springshed rejuvenation mission, an online platform would be necessary. This platform can provide successful case studies on water resilience and spring shed management to motivate people and communities.

Enabling Ecosystem: A robust policy framework recommending the conservation and rejuvenation of springs would be crucial for the long-term sustenance of any initiative in this direction. The policy framework would also help in the inclusion of springs in the water planning exercises, especially for Himalayan towns and cities such as Dharamshala.

e-Gov, ICT and Sustainable Habitats: BSKs Bridge Digital Divide & Bring Urban Transformations in West Bengal

SAADIA AZIM

Keywords: *Electronic Governance, Sustainability, Technology Interface, Digital Platforms, Information & Communication Technology (ICT), Economics, Health, Urbanisation, Digital Transformation, Equity at Grassroots, Social Security Systems, Online Deliveries, Public Service, Government, West Bengal, Bangla Sahayata Kendra (BSK)*

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The Bangla Sahayata Kendra (BSK) is an innovative online citizen delivery system in West Bengal that provides easy and fast access to public services through a single access point. BSKs provide digital tools, training, and assistance to digitally unskilled people, enabling them to access online public services without a third-party intermediary. This approach promotes citizen engagement, data-driven decision-making, smart city infrastructure, and informed digital transformations, all critical in developing sustainable urban habitats.

One significant aspect of the BSK model is bridging the digital divide among citizens by providing uniform access and assistance to public services in areas with gross economic and social disparities. Through the provision of digital kiosks up to the level of gram panchayat, where an operator assists citizens near their homes free of cost, access to public services has just become easier and simpler. A growing concern during the post-pandemic revival times is the challenge of dealing with a newer form of inequality in the digital skills of citizens. The situation needs immediate government intervention. Older people and marginalised communities have become dependent on or are left out in the fast-changing digital world. Self-reliance and swift digital skills of citizens have become crucial factors in the success of e-governance and digitisation transformations.

Therefore, the BSK's intervention in attending to citizens with a whole-of-government approach aligns it with the United Nations' Sustainable Development Goal 16 for building an effective, accountable, and inclusive government. The transformative e-governance ecosystem empowers citizens and builds on their abilities to access government services freely and fairly.

Data-driven research conducted on the BSK model shows a positive upturn in underserved sections, such as women and marginalized communities in urban habitats, who have found a compassionate government mechanism assisting them to access public services at no extra cost. In rural communities, there is a digital drive towards urbanization because of the presence of public service management and accountable governance systems

near homes. Therefore, the BSKs do not compete as a political freebie but have a multiplier effect in making transparent, responsible, and universally accessible government systems. Additionally, the BSK displays its crucial role in building livable, equitable, and environmentally sustainable communities.

This paper highlights how BSKs have delivered faster and multiple services with increased citizen footfall and service deliveries for the urban poor from under one roof at Urban Local Body (ULB) offices. At the same time, it shows how the BSKs have driven rural people towards urbanisation with assisted online public services. It is important to evaluate if BSKs are slowly empowering people with digital transformations, building an inclusive whole-of-society ecosystem. However, a multi-stakeholder intertwined technology-dependent system becomes successful only when policymakers remain committed and accountable to the fast-transforming tech advances in their surroundings and across the globe.

An Introduction

The Bangla Sahayata Kendra (BSK) is a unique e-governance mechanism that combines technology with in-person assistance to facilitate sustainable transformations, digitisation, and public service deliveries in West Bengal. This paper examines the policy framework and practices of the BSK initiative, its challenges, and milestones to assess its impact of digital transformations at the grassroots level.

Key Features:

i) The BSK model employs a hybrid approach to assist electronic deliveries of public services, and it currently onboards 57 government departments on an online interactive communication channel. By leveraging online forums, social media (Cordella, 2012), and mobile apps, BSKs promote inclusive and participatory decision-making processes that reflect the needs and priorities of the community.

ii) Moreover, the e-governance model helps collect and analyse data on urban sustainability indicators, such as energy consumption, unemployment, poverty, health, education, waste management, and air quality. This information provides policymakers with accurate and comprehensive data to make informed decisions about developing and managing sustainable urban habitats.

iii) The BSK system also supports the development of smart city infrastructure, using advanced technologies to improve efficiency and sustainability in urban systems. For instance, applications for new electricity connections and smart grids optimising energy consumption are routed through BSKs. The easy digital approval systems enable intelligent governance in revenue payment, electricity bills, waste management, trade licenses, and other areas.

iv) Importantly, the hybrid e-governance model provides assisted access to digital services, promoting faster, leaner, and more convenient systems, such as online utility bill payments, issuance of trade licenses, land records, construction approvals, and e-waste recycling programs. This approach also reduces the environmental impact of traditional service delivery methods, such as paper-based billing and physical waste disposal.

Overall, the Bangla Sahayata Kendra (BSK) is an innovative e-governance approach that empowers underserved citizens with digital access, enabling citizen engagement,

data-driven decision-making, smart city infrastructure, digital services, and bridging the deep digital divide. This model has made West Bengal a leader in digital transformations in governance, promoting public good through a whole-of-government approach (West, 2007).

Hybrid Model Aligned to UN SDGs

Mission drives policies – policies direct agencies to deliver better services to citizens that are relevant, specific, long-lasting, and effective. Whether an agency is building warplanes, distributing flood relief material, providing classroom resources, collecting electricity bills from citizens, or registering a couple's marriage, it's the need that pushes every level of government to look for new solutions for its citizens. Today's amazing mix of cloud computing, smart mobile devices, and collaborative tools are changing the citizen landscape and bleeding into government as both the opportunity and the challenge (West, 2007). New expectations from the government require them to be ready to deliver and receive information and services safely, independently, anytime, anywhere, and on any device. Governmental programs must do so safely, securely, and with limited resources, uniformly for all citizens.

Digital transformations driving urbanisation is a solution. To build for the future, governments need a collaborative approach and

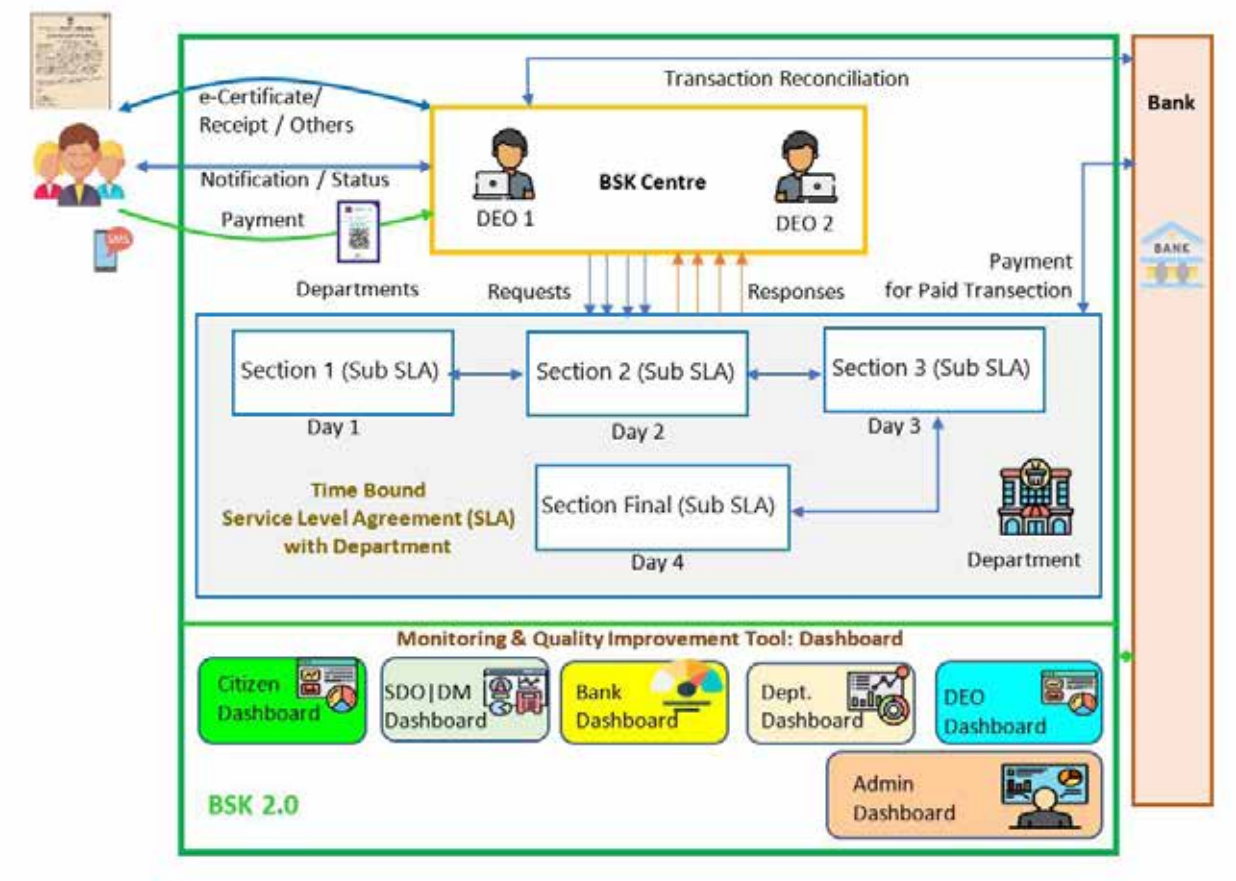

Fig 1: BSK Working Model- A Process Flow

focused digital strategy that intertwines the opportunity to innovate and enables agencies to leverage government data to improve the quality of public service deliveries. This paper analyses some of those aspects of the whole-of-the-government (Verheijen, 2019) approach increasing policy coherence, competitiveness and efficiency of departments while reducing conflicting policies, costs, duplication of work etc.

The Bangla Sahayata Kendra (BSK) hybrid model through digital Kioks manned by operators supports several of the United Nations' Sustainable Development Goals (SDGs). The BSK approach promotes sustainable transformations, public delivery systems, and digitisation in government, which aligns with SDG 9: Industry, Innovation, and Infrastructure. The BSK's focus on citizen-centric service delivery and inclusivity reflects on SDG 10: Reduced Inequalities. By providing access to digital services and promoting e-public services, BSKs contribute to SDG 11: Sustainable Cities and Communities. The BSKs' focus on collecting and analysing data on urban sustainability indicators, such as energy consumption, unemployment, poverty, health, waste management, and air quality, aligns with SDG 12: Responsible Consumption and Production (Bolívar, 2013).

Finally, the overall approach to capacitating the underserved citizens to be digital empowered aligns with SDG 17: Partnerships for the Goals. Overall, the BSK hybrid strategy shows how e-governance can ally with sustainable development and contribute to the achievement of several SDGs.

Relationships–SDGs, e-governance and ICT

The idea of e-governance is muddled with the idea of e-government. "e-governance uses information and communication technologies (ICTs) to support public services, government administration, democratic processes, and relationships among citizens, civil society, the private sector, and the state." (Connolly, 2012). The ICT industry has a long tradition of re-labelling technologies (Remenyi, January 2009). The blurring of e-governance and e-government is confusing as e-governance is a distinct field of study that is not just governance with an electronic cover.

The BSK working model is an e-governance program that utilises information and communication technologies (ICTs)to support public services, government administration, democratic processes, and relationships among citizens, civil society, the private sector, and the state(Connolly, 2012). E-governance is a distinct field of study that is different from e-government, and it is a governance model for the information age that seeks to utilise appropriate technology to deliver greater democracy, uniform accessibility, fair, and efficient services(Palvia, 2007).

The BSK system employs such an approach. It focuses on using adequate ICT to manage organisational resources and administer policies and procedures, making it more effective than just e-government or governance. It deals with a spectrum of relationships and networks within the government regarding the usage and application of ICTs. The effectiveness of ICT used in BSKs at Gram Panchayats in West Bengal helps understand policy makers if they have streamlined and strengthened urbanisation and digitisation, building sustainable habitats at grassroots. Also, an in-depth analysis connects it to the principles and objectives of e-governance and ICT(Riley, 2010).

e-governance and SDG

The relationship between e-governance and Sustainable

Development Goals (SDGs) is significant in the present BSK model, particularly in achieving Goal number 16 of the UN's 2030 Agenda for Sustainable Development, (UN- Transforming Our World -The 2030 Agenda for Sustainable Development, 2015). The goal emphasises the importance of effective, accountable, and inclusive institutions at all levels. E-governance plays a critical role in ensuring public access to information, opportunities, and institutions, which supports the principles of SDGs.

The electronic solutions of governance have the potential to create an ecosystem for peace, justice, and strong institutions for Climate Action, Industry, Innovation, and Infrastructure, building sustainable cities and urban communities. Therefore, strengthening national institutions and promoting laws and policies for sustainable development through national & international cooperation is essential.

In the e-governance model, access to technology and its proper use is vital for citizens as it provides leaner, cleaner, transparent, and accountable governments and societies. The use of ICT systems includes capacity building of people living at the grassroots, aiming to develop a technology-backed relationship between citizens and government for potential electronic deliberation over civic communication, policy evolution, and democratic expressions of citizens will. These actions align with the SDG goal for inclusive and sustainable economic growth and promote sustainable cities and communities.

ICT and SDG

The relationship between ICT and Sustainable Development Goals (SDGs) is also critical, particularly in low-income and diverse countries such as India, where substantial effort, innovation, investment, and policy intervention are required to close the development gap. Proper use of ICT is a crucial enabler in achieving the SDGs.

During the UN's Millennium Development Goals, mobile broadband was in its infancy and considered a rapidly evolving, 'leapfrog' technology. Now, it has reached maturity, and its significance in everyday life, especially in India during the pandemic, has grown many folds. By 2022, the world's second-largest internet population was over 930 million users, with projections to grow to 1073 million by 2024 and 1341 million by 2030 (The Earth Institute, 2016). In 2020, 744 million users accessed the internet via mobile phones, and that number is expected to grow to 1.5 billion users by 2040 (Basuroy, 2022).

Mobile phones are already enabling dramatic breakthroughs in e-finance, e-education and e-health, overcoming longstanding gaps in the process of universal access to public services such as banks, health clinics, food and supplies department, or the police station. In many parts of the world, ICT is transforming cost-intensive public services and paving the way for advances in e-commerce, governance, trade, and transportation. These objectives meet the SDGs of sustainable cities and communities, industry, innovation, and infrastructure. By leveraging ICT, governments can drive digitisation and urbanisation at grassroots levels, creating sustainable and resilient communities.

The BSK operations serve as a concrete example of how using the right ICTs can empower citizens at the gram panchayat level by providing multiple online government services under one roof. By providing assisted digital services through BSK operators freely from BSKs, the system is progressively dismantling barriers to government interactions at the grassroots level.

e-Governance, ICT and SDG

In the BSK model, the use of ICT for e-governance is instrumental in meeting the SDGs. The UN's SDG Goal 16 emphasises the importance of effective, accountable, and inclusive institutions at all levels, and e-governance has been critical in ensuring public access to information, opportunities, and institutions. By leveraging appropriate ICT, the BSK model aims to provide leaner, cleaner, transparent, and accountable governments and societies, which will enable the development of an electronic ecosystem for peace, justice, and strong institutions.

The BSK model recognises that the digitisation and urbanisation of grassroots communities are crucial in achieving the SDGs, particularly in countries like India, where the development gap requires substantial effort, innovation, investment, and policy intervention. ICT is a crucial enabler in this regard, especially mobile broadband technology, which has matured significantly in recent years. The BSK model leverages the technology to transform cost-intensive public services and direct benefit government schemes paving the way for advances in e-commerce, trade, and transportation and education, among other things.

Integrating government systems, ICT, and technology is essential in meeting the SDGs for societal development. The BSKs enable this integration to deliver progress against the goals. By leveraging technology transformations, the BSK model addresses several SDGs, including those with opportunities to access clean and sustainable water, housing, poverty alleviation, gender equality, food security, nutrition, productive agriculture, and smart, sustainable cities.

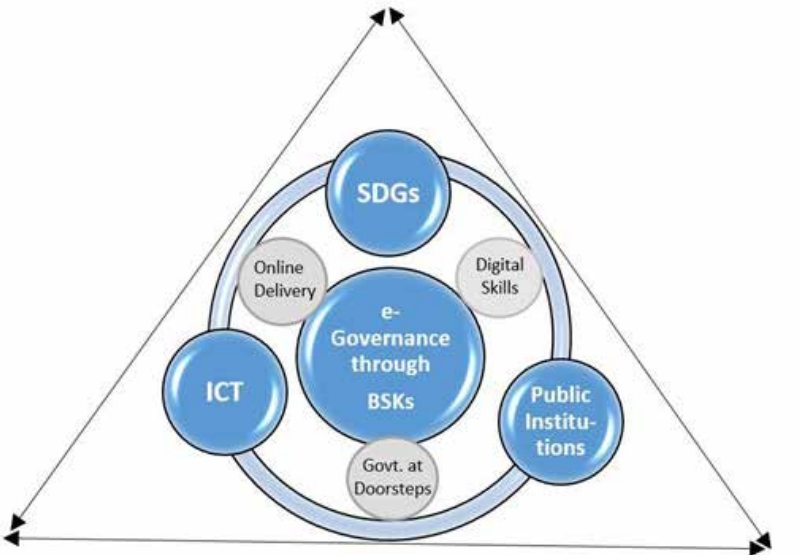

Fig 2: BSK- Intertwined Relationships: ICT, SDGs and e-Governance

While the BSK model acknowledges practical barriers like the uniform availability of digital tools and skills at the grassroots for large-scale implementation of public systems in areas like e-health, m-health, mobile commerce, e-education, and transportation services, BSKs mitigate these challenges too. They offer free assistance through BSK operators. These operators, selected through a specific process, are tech-savvy government staff and adhere strictly to the country's data security laws. A snapshot of the BSK collaborative model is shown below:

Milestones and Challenges

The BSK portal (Personnel and Administrative Department, n.d.) is an integrated system of information, services, outreach, and delivery that uses digital operational tools to provide public services and governance to citizens of West Bengal.

Milestones and Benefits through BSKs:

i) Improved accessibility and convenience for citizens: The BSK portal offers a single-window web platform for citizens to avail multiple public services without the need to physically visit government offices. This enhances accessibility and convenience for citizens, particularly those in remote areas who face difficulties in accessing government services(Bagga, 2016).

ii) Reduction of corruption: The digital delivery of public services through the BSK portal minimises the chances of corruption and improves transparency in the system. This helps to build trust between citizens and the government particularly in areas that are not digitally advanced.

iii) Inclusive and sustainable development: The BSK portal enables the whole-of-government approach through digital transformation, providing an inclusive and sustainable citizen-centric online delivery ecosystem for G2C services. This creates an environment for citizens to access government services easily and build their capacity independently to avail those services bridging digital divide and bringing advancement through urbanisation at grassroots.

iv) Cost-effective and efficient service delivery: The BSK portal offers end-to-end online public service delivery to citizens free, fast and in farfetched areas reducing the cost-of-service delivery for people. The platform enables the government to manage citizen data, address their requirements and resources district-wise, resolve complaints more efficiently and effectively, with minimal human intervention.

v) Job creation and skill development: The portal has the potential to create employment opportunities and skill development for citizens, particularly among SMEs at the grassroots level. This contributes to the development of the local economy (Bagga, 2016). People have direct access to loans, schemes and resources at their doorsteps minimising the scope for intermediaries.

vi) Lastly, the BSK enhances digital public infrastructure (DPI) by providing a comprehensive suite of digital public goods in a coordinated, controlled, and uniform manner.

Yet challenges galore with the data pool created daily even when BSKs do not access or store the personal identifier information, and data processed through BSKs are shared only through a secure and sanitised Application Programming Interface (API).E.g., approximately 12 lakh data points are created and processed through the portal every day.

Challenges

i) Insufficient Public Sector ICT Policy Frameworks: For the successful implementation of e-governance initiatives, such as the BSK portal or other single window platforms, a dedicated policy framework focusing on ICT in the public sector is essential. For instance, varying technologies, and goals, dependence on multiple private vendors with limited capacity adopted by different departments, tailored to their needs, often fail to seamlessly integrate with the unified BSK system.

ii) Limited Physical Infrastructure for Digital

Access: A lack of essential physical infrastructure, including digital access and broadband mobile, in certain areas hampers citizens' access to the BSK portal, even via BSK operators who are located within the same regions.

iii) Low Public-Private-Partnerships for e-gov solutions: The low participation of private entities in e-gov solutions result in limited resources for the development of the BSK portal and other similar initiatives.

iv) Stagnation among Grassroots SMEs: The dearth of innovation and expansion among SMEs at the grassroots restrict the BSK portal's potential in catalysing employment and skill development in these communities.

v) Limited Interoperable ICT Components: For e-governance models like BSK to thrive, the interoperability of ICT-based system components is pivotal. There's a pressing need for more components capable of interoperability across various platforms on a broad scale.

vi) Low skills to manage the ICT systems: There is a need for skilled personnel to manage the ICT systems used in the BSK portal and other e-governance initiatives. Lack of skilled personnel can affect the effectiveness and efficiency of the system.

Methodology – Determinants of BSK Operations in Urbanisation and Digitisation

We took a mixed-methods approach that combined quantitative and qualitative data collection and analysis methods to study the impact of the BSK network, e-delivery of public services and urbanisation through digitisation.

A) Analysis of the BSK Network

a. The study of the digital kiosks was conducted based on the online footprints of citizens on the BSK portal.

b. Three parameters were observed – a) Services that did not involve financial transactions b) Services that involved financial transactions by using e-wallet (payment systems) c) District-wise in West Bengal

c. Time Period- Feb 01- Feb 28, 2023

Inferences:

i) Bigger districts with substantially large number of BSKs provided more digital services to people including financial services. (Eg: Purba Midnapur has 239 BSKs, North 24 Parganas has 260 BSK whereas Kolkata has 39 and Jhargram has 82 BSKs).

ii) People used the BSK assistance more for non-financial services such as accessing digital certificates, schemes of government, application for land records, or loans etc that could better organize lives of people and their living conditions.

iii) BSKs present in Urban Local Bodies (ULBs) and Gram Panchayats (GPs) show that the regions have implemented e-delivery of public services for several revenue generating departments such as Land, Power, Transport, Education, Small and Medium Enterprises etc. The study helped identify best practices and challenges in implementing e-services at the grassroots and itsimpact on urbanization and digitization in the far-fetched areas through the provision of online

public services deliveries provided at BSKs.

B) Performance of the e-Delivery process of BSKs:

a) Online Study through data points present on BSK portal

b) Parameters Observed: Comparative performance of BSKs at ULBs in 23 districts

c) Time period: 01 September 2022- 28 Feb, 2023

Inferences:

i) The BSK system effectively introduced digital governance at the grassroots, allowing citizens to access multiple services from one location without any extra cost.

ii) There is a gradual increase in the e-delivery services with growing footfall of people, multiple services sought at BSK level, more bills and revenues paid.

ii) Since the service delivery mechanism was direct and fast it reduced involvement of intermediaries and people gradually became self-dependent. Eg: Certain small towns saw large number of young girls and boys seeking driving licences from

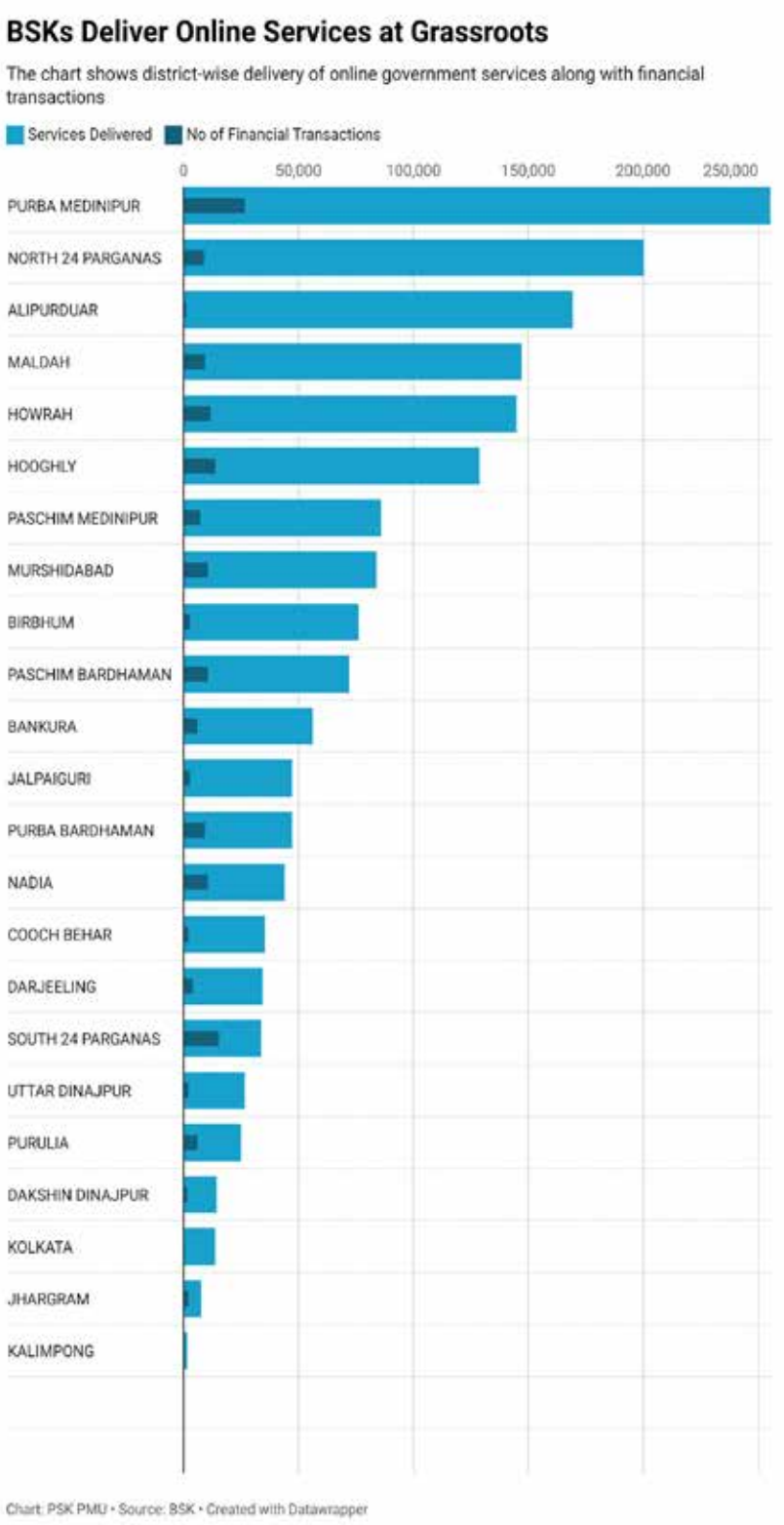

Fig 3: District-wise use of BSKs for Public Service Deliveries

BSKs and thus increase in demand for two wheelers etc.

iii) As more services were integrated into the BSK system, there was a noticeable increase in footfall, affirming its success in reaching a wide audience.Eg: Regular monthly bill payments of electricity, property tax, trade license renewal etc.

iv) The frequent in-person visits to BSKs for digital guidance underline the broader need for enhancing individual digital proficiency.

v) Residents in ULB areas have increasingly turned to BSKs as a comprehensive solution for all their government-related interactions. For instance, the rise in applications for caste certificate deliveries, health cards, and student credit cards underscores the BSKs' role in fostering informed citizens and promoting transparent governments.

vi) Grassroots communities heavily frequented BSKs for digital support regarding online services. In December 2022, BSKs recorded a significant surge in online transactions and visits by citizens seeking trusted digital support for all

Analysing Citizen Footfall and Online Services delivered at BSKs located at ULBs in 23 districts of West Bengal
Shows People Visit BSKs Seeking Assistance for Online Services

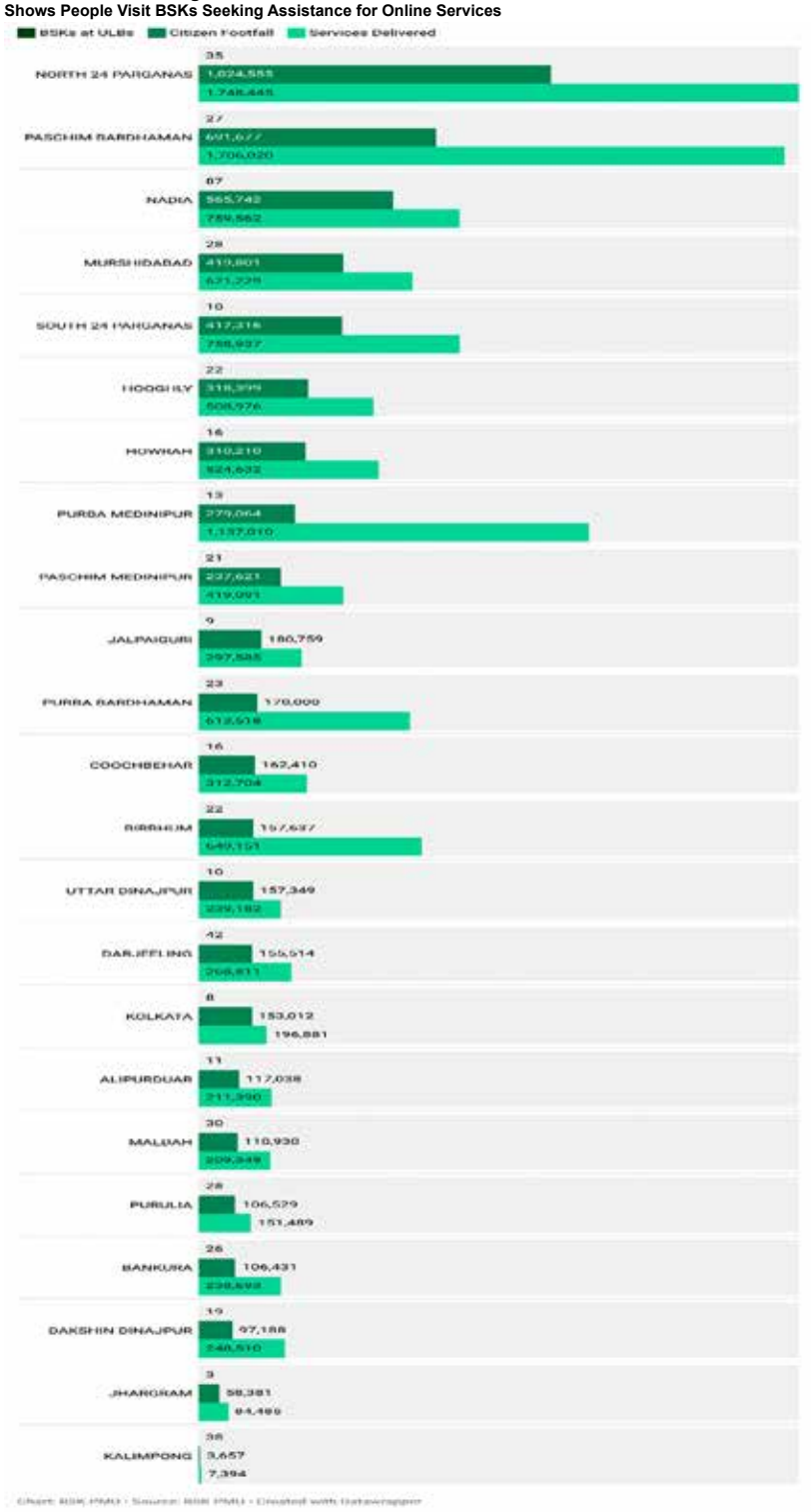

Fig 4: Chart shows increase in number of citizen footfall in densely populated districts with BSKs at ULBs

government interactions.

vii) An online survey conducted among gram panchayat citizens revealed a strong preference for assistance in accessing government services and schemes. The support by operators allows citizens to focus on their work without the inconvenience of navigating various departments.

C: BSKs for urbanisation through digitisation:

a) BSK datapoints created for online services on the portal in particular datasets

b) Parameters: Disposal of online service deliveries through BSKs

c) Time Period: September 2022- December 2022

Inferences:

i) The use of OTP (One-Time Password) for service delivery has increased trust in the system and secured personal data of citizens.

ii) When visiting the centers, citizens accessed a wide range of services, from obtaining health cards and student credit cards to handling property taxes, driving licenses, and marriage certificates. They also inquired about

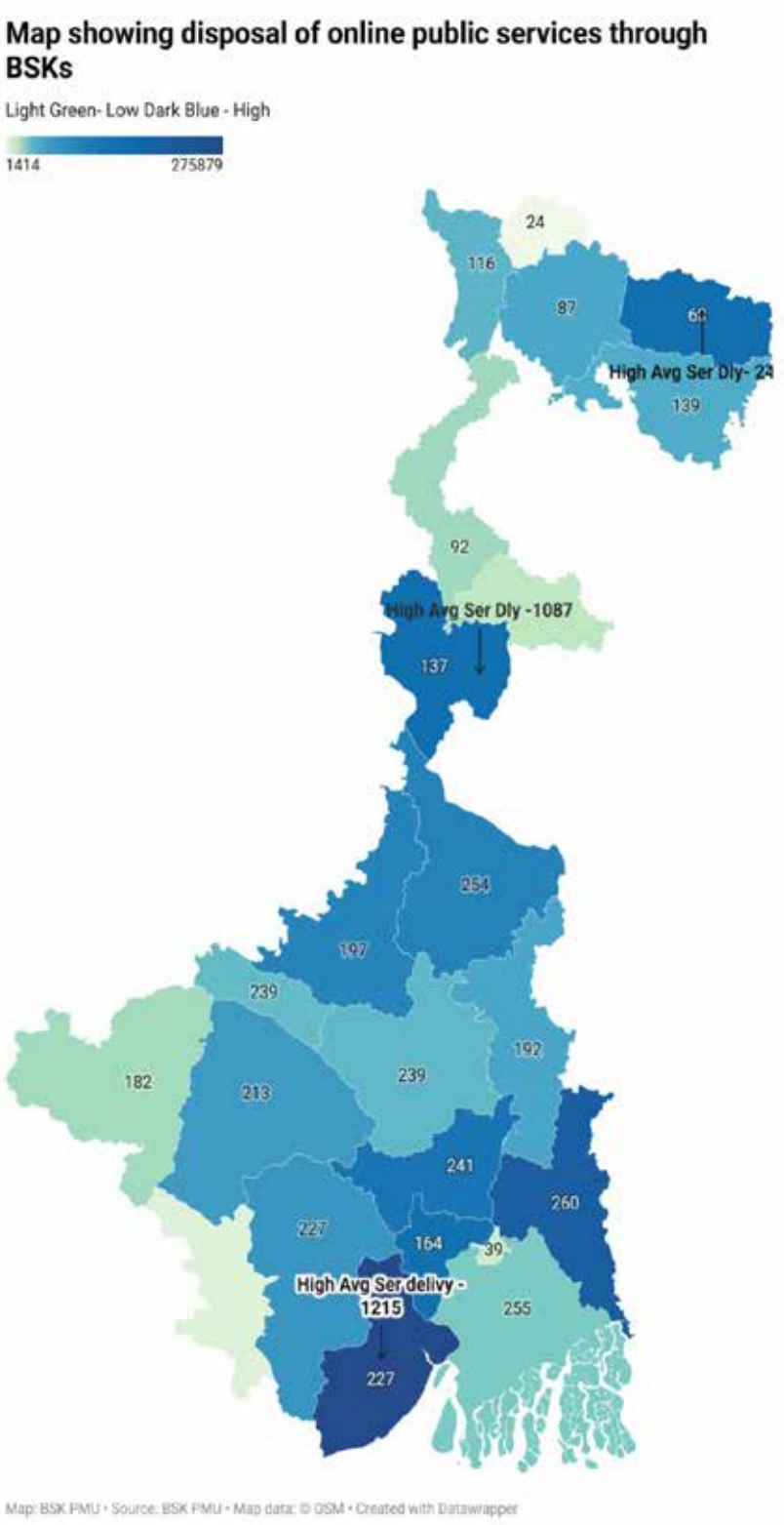

Fig 5: The BSK network (numbers) in the districts across West Bengal

vegetable prices via the "Sufal Bangla" initiative from the Agriculture Marketing department and sought tourism-related services.

iii) The diversity and volume of services requested at gram panchayat offices indicate that citizens are well-aware of their entitlements and the resources provided by the government.

iv) Frequent visits to these centers highlight a growing reliance on digitisation, signaling increased urbanisation not only in under-served urban areas but also in rural regions.

v) Having a BSK near their homes, is making government processes more efficient, and easy e-messages remind people to regularly settle their bills.

Conclusion

To conclude, the BSK model of e-governance has been successful in somewhat bridging the digital divide and bringing government services closer to citizens. However, the fast-emerging technological advances and other challenges like infrastructure limitations and lack of digital literacy among citizens need to be addressed to sustain this model. While

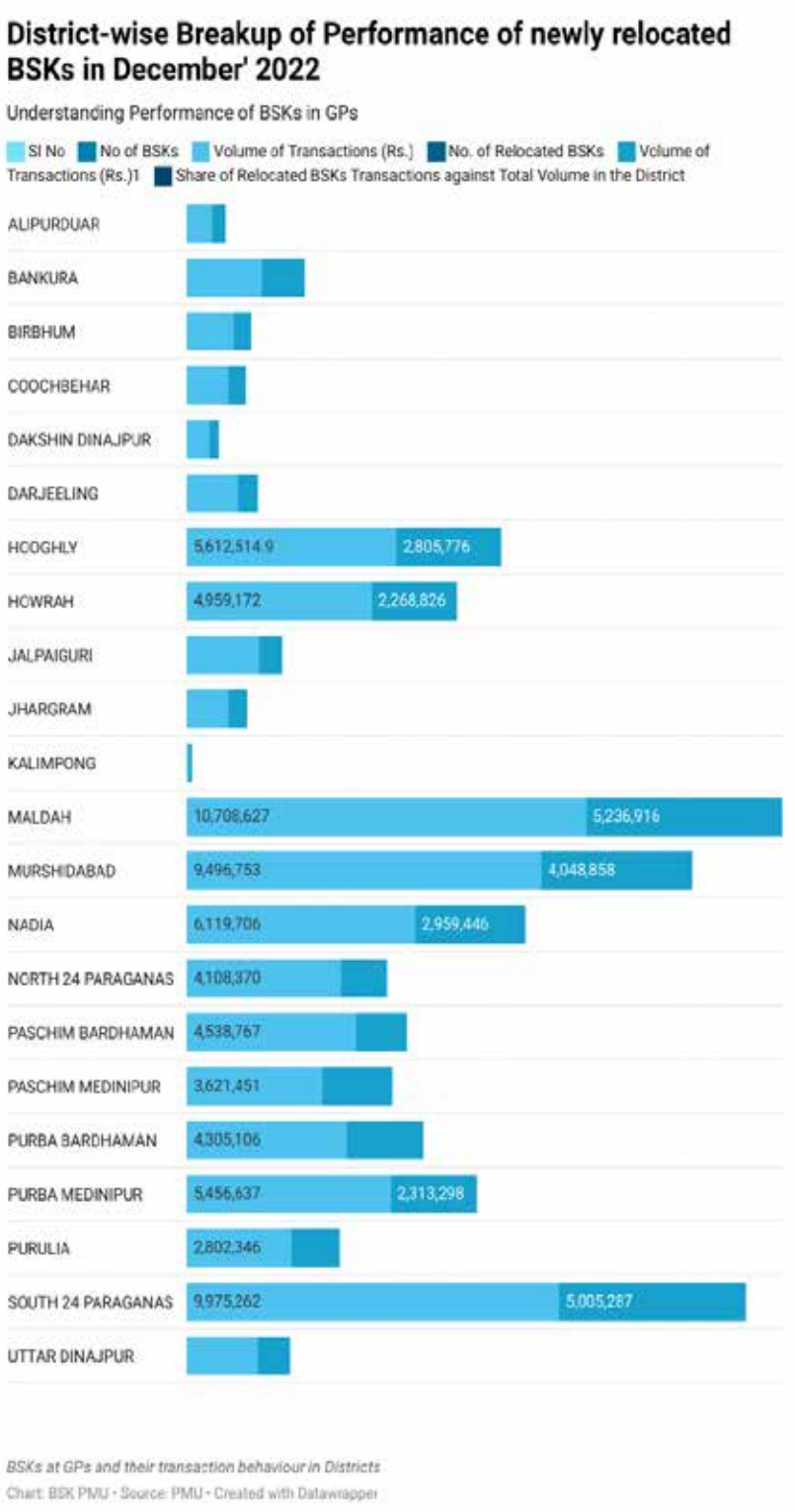

Fig 6: Chart showing district-wise financial transactions from BSKs relocated at Gram Panchayats

the BSK model has contributed to the process of urbanisation at the grassroots level, it has also made citizens dependent on government facilities. It is important to empower citizens to be self-sufficient digitally while providing assistance in the online delivery system. By enabling citizens to participate more actively in the governance process, the BSK model can foster a greater sense of community ownership and empowerment. The impact of e-delivery of public services on digital transformation has improved the efficiency and effectiveness of public service delivery system, enabling governments to provide services to a larger number of citizens and improve the quality of services delivered. The impact of the BSK model on urban transformation will depend on several other factors, including the level of infrastructure development, the degree of citizen participation, and the availability of resources and support from government and other stakeholders. Nonetheless, the BSK model has the potential to be a powerful tool for driving urban transformation and improving the lives of citizens in underserved areas.

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