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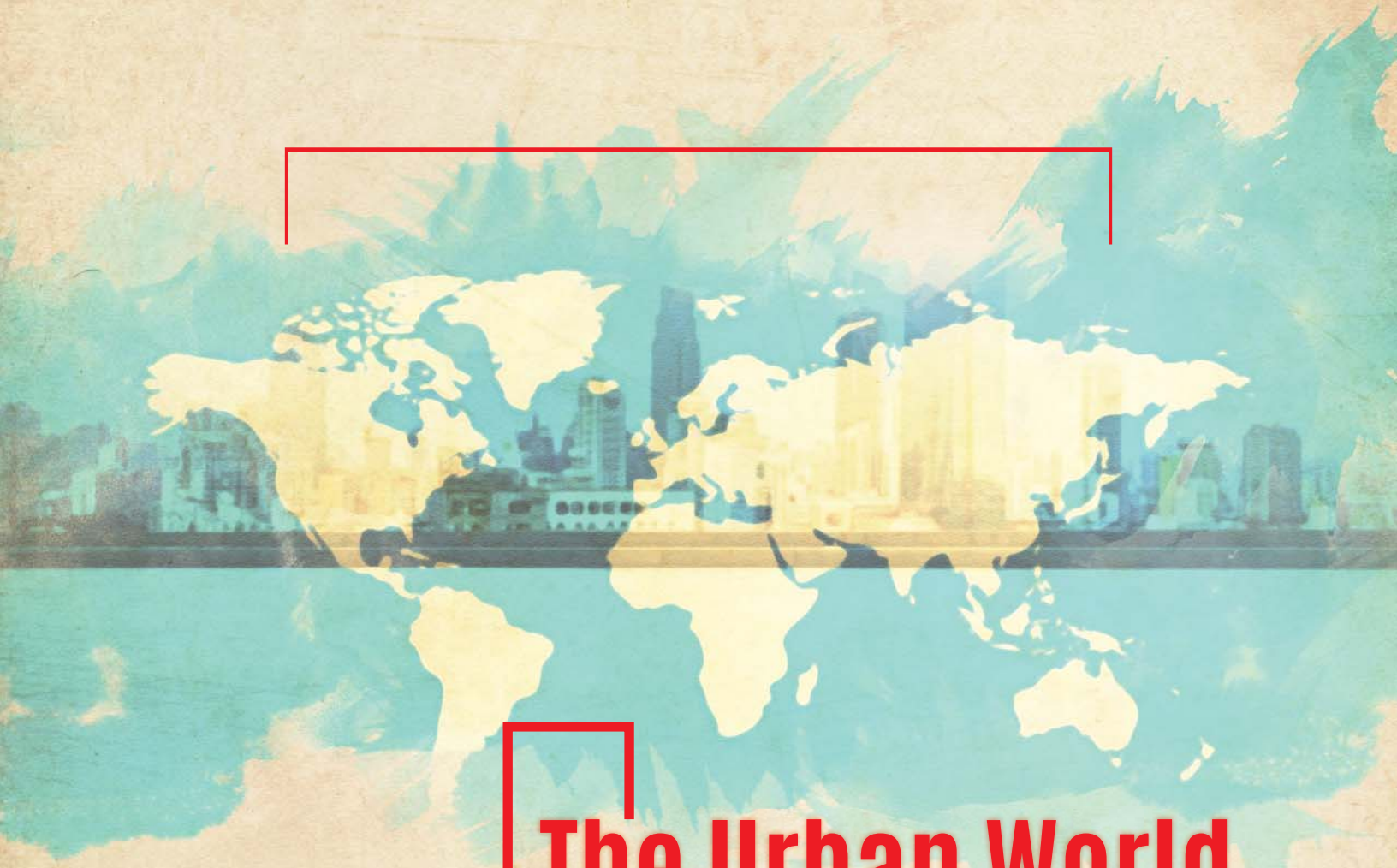

The Urban World

Quarterly Publication

Regional Centre for Urban and Environmental Studies
All India Institute of Local Self-Government, Mumbai

RCUES
Mumbai

Regional Centre for Urban & Environmental Studies (RCUES), Mumbai

(Fully supported by Ministry of Housing and Urban Affairs, Government of India)

Established in 1926, the All India Institute of Local Self Government (AIILSG), India is a premier autonomous research and training institution in India. The Institute was recognized as an Educational Institution by Government of Maharashtra in the year 1971. The Institute offers several regular training courses in urban development management and municipal administration, which are recognized by the Government of India and several State Governments in India.

In the year 1968, the Ministry of Housing and Urban Affairs (MoHUA), earlier Ministry of Urban Development), Government of India (GoI) established the Regional Centre for Urban & Environmental Studies (RCUES) at AIILSG, Mumbai to undertake urban policy research, technical advisory services, and building work capabilities of municipal officials and elected members from the States of Goa, Gujarat, Maharashtra, Rajasthan and UTs of Diu, Daman, Dadra & Nagar Haveli. The Ministry of Housing and Urban Affairs (MoHUA), Government of India added States of Assam and Tripura from February, 2012 and Lakshadweep from August 2017 to the domain of RCUES of AIILSG, Mumbai. The RCUES is supported by the MoHUA, Government of India. The MoHUA, Government of India has formed National Review and Monitoring Committee for RCUES under the chairmanship of the Secretary, MoHUA, Government of India. The Principal Secretary, Urban Development Department, Government of Maharashtra is the ex-officio Chairperson of the Advisory Committee of the RCUES, Mumbai, which is constituted by MoHUA, Government of India.

The RCUES was recognized by the Ministry of Urban Development, Government of India as a National Training Institute (NTI) to undertake capacity building of project functionary, municipal officials, and municipal elected members under the earlier urban poverty alleviation programme-UBSP. The RCUES was also recognized as a Nodal Resource Centre on SJSRY (NRCS) and Nodal Resource Centre (NRC) for RAY by Ministry of Housing and Urban Poverty Alleviation, Government of India.

The AIILSG, Mumbai houses the Solid Waste Management (SWM) Cell backed by the Government of Maharashtra for capacity building of municipal bodies and provide technical advisory services to ULBs in the State. The Water Supply & Sanitation Department (WSSD), Government of Maharashtra (GoM) established Change Management Unit (CMU) in AIILSG, Mumbai from 13th January, 2010 to 30th June, 2014 and also selected AIILSG, Mumbai as a Nodal Agency in preparation of City Sanitation Plans for 19 Municipal Corporations and 15 A Class Municipal Councils in Maharashtra State, under the assistance of Ministry of Urban Development, Government of India. The WSSD, GoM also established Waste Management & Research Centre in AIILSG, Mumbai, supported by Government of Maharashtra and MMRDA.

In August, 2013 Ministry of Urban Development, Government of India empanelled the AIILSG, Mumbai as Agency for providing technical support to the Cities / Towns of States / Urban Local Bodies (ULBs) in the field of Water Supply and Sanitation, Sewerage and Drainage systems.

In July 2015, Ministry of Urban Development, Government of India empanelled the RCUES & AIILSG, Mumbai an Agency for technical support in Municipal Solid Waste Management under Swachh Bharat Mission (SBM) programmes.

In February, 2016, Ministry of Housing and Urban Poverty Alleviation, Government of India empanelled the RCUES of AIILSG, Mumbai for conducting training and capacity building programme for experts of SMMU, CMMUs, COs, Key Officials and other stakeholders of the State and Urban Local Bodies (ULB) level under Deendayal Antyodaya Yojana – National Urban Livelihoods Mission (DAY – NULM).

In December, 2017, AIILSG has been empanelled as a training entity regarding implementation of new Integrated Capacity Building Programmes (ICBP) under Urban Missions, viz. Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Swachh Bharat Mission (SBM), Smart Cities Mission (SCM), National Urban Livelihoods Mission (NULM), Housing for All (HFA), Pradhan Mantri Awas Yojana (PMAY) and Heritage City Development and Augmentation Yojana (HRIDAY) for Elected Representatives and Municipal Functionaries.

At present, RCUES and AIILSG, Mumbai is involved in providing capacity building, research and technical support to number of State Governments and ULBs for implementing various urban development missions and programmes launched by the GoI.

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The Urban World - Quarterly Publication of Regional Centre for Urban and Environmental Studies of All India Institute of Local Self Government, Mumbai

(October - December, 2019)

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Editorial

From Waste to Wealth

Municipal solid waste (MSW) is one of the major areas of concern all over the world. In developing country like India, there is rapid increase in municipal solid waste due to urbanization and population growth. Composition of waste varies with different factors like living standard, climatic condition, socio-economic factor etc. Currently, 1,27,486 tons per day of municipal solid waste is being generated due to various household activities and other commercial & institutional activities (CPCB, 2012).

Municipal waste and certain industrial waste have comparatively significant impact on environment. To overcome this problem, effective solid waste management must be implemented. The objectives of solid waste management are to control, collect, process, utilize and dispose of solid wastes in such an economical way which protects health of human being and natural environment and the objectives of those served by the system. Since the launch of the Swachh Bharat Mission, the scenario of solid waste management has been changing continuously. Still, there is a long way to implement an effective solid waste management practices. Even today, solid waste generated is often disposed without proper treatment. Lack of proper disposal of solid waste is one of the biggest obstacles in implementing effective solid waste management. Though, plastic and paper recycling sector is growing due to huge market demand for these commodities. Improper collection, unavailability of transportation in some areas, lack of advancements in treatment technologies, financial shortage in municipalities are other factors for poor solid waste management practices. With the rise of the concept of 'circular economy' and 'zero waste cities', waste is now being looked upon with a different perspective. It is important to recognize the fact that waste can be a resource if is utilised in the right manner.

In this issue, we carry a paper on the subject of dry waste management under Swachh Bharat Mission – Urban, in the state of Maharashtra. Since the launch of the Mission in 2015. RCUES, Mumbai has been dedicatedly working towards enabling better sanitation, hygiene and waste management in cities. In order to support Government of Maharashtra in the management of dry waste RCUES of AIILSG, Mumbai had undertaken a research study which attempted to address the issues and challenges faced by the ULBs in recycling their dry waste by identifying the potential markets for the segregated and recyclable dry waste and suggesting a sustainable revenue generating models for the ULBs.

Editorial

In this issue, we also carry a paper on role of ICT skills education for women. Of the top 100 tech companies in the world, just about 6 percent are headed by women. While a third of the workforce employed in the Information and Communication Technology (ICT) sector is women (seems acceptable), only a small proportion is in formal jobs. Although these estimates could vary with the source, the message is clear – that women are grossly underrepresented in the ICT world, particularly the formal one. Appropriate education and skilling are crucial inputs in making women ready for the workplace and these must include computing skills in good measure if they are not to be left behind. While such basic ICT education may not be enough for one to access the higher levels of the organisation, it can atleast remove any barriers to employment and job performance.

This issue carries a review of a book about women at work in Asia. Alongside there is another paper related to urban issues in India.

Feasibility Assessment of Cluster Level Dry Waste Management- A Case of Maharashtra

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1. Background/ Introduction

Under Swachh Bharat Mission Urban and in accordance with the SWM Rule 2016, it is mandated that all the Urban Local Bodies (ULBs) in India should achieve 100% segregation of waste, primarily into wet waste and dry waste. As a result of various Government initiatives and interventions, extensive awareness generation and ULB level actions, it is observed that ULBs have begun with segregation of waste. Although 100% segregation is not achieved, it is partially achieved with methods adopted for segregating waste.

Wet waste processing and composting is well known to the ULBs and most of them have already started doing the same. However, dry waste which is being sorted further into various categories like paper, plastic, glass, metals etc., many a times does not find a proper destination. While every ULB is making an effort to increase the percentage of segregation and sorting of waste, it was necessary that they are provided with adequate options for managing the sorted dry waste. Given the financial constraints of the Urban Local Bodies, management of dry waste by a single ULB may not be a financially viable option. Hence, a cluster based model for management of dry waste was being explored. This research attempted to understand the feasibility of a cluster level management of dry waste of Urban Local Bodies.

The aim of the study was to assess the feasibility of dry waste management for Urban Local Bodies at cluster level. The objectives were:

- To identify parameters that affect feasibility of cluster level dry waste management.
- To identify probable cities and industries that can be integrated to form clusters

2. Methodology

In line with the established aim and objectives, the study was envisaged to adopt a combination of select primary and secondary research methods. The primary methods chosen were questionnaires, field observations and interviews with stakeholders. Division wise visits to cities having more than 80% segregation were carried out to understand the existing situation of waste types, their availability, quantity and quality. A thorough review of available literature was conducted which referred wide range of sources including but not limited to various government reports and acclaimed publications. The secondary sources of data collection also included government websites and journal articles. Case studies were an essential resource, as the research study was an in-depth investigation of the current scenario of the ULBs in Maharashtra which are recycling their dry waste post segregation and generating revenue for themselves and therefore, a review of available examples was fundamental to the study.

Successful cases of cluster level dry waste management in India were reviewed to identify the good practices and parameters based on which the cluster level management can be done successfully. These case studies highlighted the management model, stakeholder involvement, financial considerations etc. that is required for the different models. Currently cluster level SWM was carried out in two states in the country, namely, Goa and Madhya Pradesh.

3. Overview of Solid Waste Management in India

The increase in quantity of solid waste generation is directly proportional to the rate of urbanization and migration of rural masses to urban areas. Also, the composition of solid waste is hugely dependent on consumer patterns, citizen lifestyle and food habits. According to Central Pollution Control Board Report (CPCB, 2015), about 337 million (Census, 2011) of India's urban population, that is 31% of total population generates 1,43,449 metric tons per day and 62 million tons of municipal solid waste per annum of Municipal Solid Waste (Planning Commission Report, 2014). Further adding to the problem, the generation of Municipal Solid waste has increased by 2775 (MoUD, 2016) within a decade, due to increase in the total number of Statutory and census towns from 5161 in 2001 to 7936 in 2011.

As per the annual review report of CPCB 2015-16, a total quantity of 1, 35,198 TPD is generated out of which 1, 11,028 is collected, 25, 572 is treated and 47, 456 TPD is landfilled (CPCB Report, 2016)6. The MSW collected for the year 2015-16 accounts for approximately 82% of the total MSW generated while as per annual report for the period of 2014-15, a total quantity of 1, 41,064 TPD was generated out of which 1, 27,531 was collected. It is noted that about 34, 752 TPD was treated and 4, 515 TPD was landfilled (CPCB, 2015). The MSW accounts to approximately 90% of the total waste generated.

4. Dry Waste Scenario in Maharashtra

As per the calculations based on 2017 population and an assumption that Western India generates recyclables - dry waste of about 21.44% [1] of the total MSW, the 384 ULBs in the state of Maharashtra, generate dry waste of about 6, 378 MT/day.

According to a recent research study carried out by Regional Centre for Urban and Environmental Studies (RCUES) of All India Institute of Local Self Government (AIILSG), Mumbai, it has been observed (as per the primary surveys conducted)

Table 1: Category wise Quantity of Dry Waste Sorted at Dumping Site

Divisions	Plastic (TPD)	Glass (TPD)	Thermocol (TPD)	Paper (TPD)	Cardboard (TPD)	Cloth (TPD)	Footwear (TPD)	Metal (TPD)
Amaravati	14.27	1.39	0.54	7.34	4.36	1.64	1.46	0.39
Aurangabad	21.51	2.09	0.81	11.07	6.58	2.48	2.21	0.58
Nagpur	20.17	1.96	0.76	10.37	6.17	2.32	2.07	0.54
Nashik	31.65	3.07	1.20	16.28	9.68	3.64	3.24	0.85
Konkan	176.59	17.15	6.67	90.83	53.99	20.33	18.10	4.76
Pune	57.51	5.59	2.17	29.58	17.58	6.62	5.90	1.55
Total	321.70	31.24	12.15	165.48	98.36	37.03	32.98	8.68
Total	707.63 TPD							

Source: RCUES Study on 'Identifying Market Potential for Recyclable Solid Waste in Maharashtra', 2017

[1] Annepu R (2012), Sustainable Solid Waste Management in India by Ranjith Kharvel Annepu, Columbia University in the City of New York, Waste-to-Energy Research and Technology Council (WTERT), Columbia University – Earth Engineering Center

that the ULBs are sorting the dry waste manually and are able to sort dry waste into different categories including, plastic which is the major contributor of dry waste in various types such as bottles, polythene bags, wrappers, packaging material etc. About 5.56% of the total dry waste arriving at the dump yard constitutes of plastics. Paper and Cardboard together is the next major contributor of the municipal dry waste, which comprises of about 4.56% of the total dry waste. The following table elaborates the quantities of dry waste arriving at dump yard across types of ULBs in the eight categories that are majorly being sorted currently in Maharashtra.

5. Concept of Cluster Level Dry Waste Management

The amount of dry waste generated in Urban Local Bodies is limited. Currently, wet waste in Indian cities is managed mostly through composting or waste to energy, however, dry waste recycling has multiple components and requires handling by multiple industries based on available technologies. Therefore, given the limited quantity of dry waste and the cost of installation of multiple recycling options to be borne individually by each ULB, this kind of arrangement may not be viable for ULBs given their financial condition. As opposed to this, if a cluster of ULBs engage in the management of dry waste, the model may implementable not only in terms of cost but also in terms of the quantity of waste. Over and above this, the ULBs may also earn revenue out of it through the rates offered by the industries in lieu of the waste received. A cluster could comprise of a group of 4-5 ULBs handing over a substantial amount of segregated dry waste to a recycling industry which would collect the waste at an agreed frequency.

As mentioned above, of the total dry waste arriving at processing site in segregated manner, plastic constitutes the highest percentage at around 5.56% followed by paper at 4.56%. Considering the vast extent to which this study can be applied, to ensure that proper scale is maintained, a sample study area of Maharashtra state has been considered. Further, since all the categories of dry waste generated in the city cannot be included in the study feasibility of clusters for only plastic waste has been explored.

6. Case Studies of Cluster Level Solid Waste Management in India

Currently cluster level SWM is carried out in two states in India, namely, Goa and Madhya Pradesh. This chapter looks into the case studies of these two states to understand the management model, stakeholder involvement, financial considerations etc. that is required for the working of the cluster level waste management.

a. Plastic Waste Management- Goa Model

Goa being a major tourist destination, dry waste generation of the state is very high. Goa Waste Management Corporation (GWMC) has signed a MoU with Vasavadatta cement factory of Karnataka for recycling of plastic waste. The MoU intimates all the ULBs in the state to send their plastic waste to the cement factory. The GWMC is responsible for developing a strategy for the collection, segregation and transportation of plastic waste to the industry. GWMC has identified collection and bailing points across the state. ULBs send their segregate dry waste to one of the nearest centers, where it undergoes further segregation by the persons appointed by the cement factory. The segregated plastic waste is then bailed for transportation.

Functioning of cluster level solid waste management is monitored at state level by GWMC which ensures proper functioning of the system.

b. Integrated Solid Waste Management- Madhya Pradesh Model

Madhya Pradesh State Government Vision of 2018 emphasized on implementation of Solid Waste

Management in all ULBs of the State. During that time none of the 379 ULBs had Integrated Solid Waste Management system (ISWM) comprising of all components as per Solid Waste Handling & Management Rules 2000/ 2016. Inadequate man-power, lack of technical know-how and insufficient finances were some of the issues faced by the ULBs while implementing the SWM. To address these issues the Government of Madhya Pradesh has decided to implement integrated SWM in all the ULBs of the state by forming clusters of the ULBs through involvement of private sector.

Formation of clusters and feasibility study of the same is undertaken by the State through a third party. Feasibility study of the clusters was prepared based on the geography, culture, waste generation, administrative jurisdiction etc. The clusters have been formed wherein a larger ULB has been chosen as lead member where the regional processing facility will be developed. Smaller ULBs within the distance of 50-80 kms from the lead member city are made part of the cluster, wherein MSW from the smaller cities will be transported to the regional processing facility. To optimize waste collection, clusters have been formed so that total waste is around 150 TPD.

Approach for cluster management: All ULBs of the cluster are required to sign an Inter ULB agreement authorizing the larger ULB to act as lead member. ULBs to authorize Commissioner, UAD/ State Mission Director -SBM to conduct the bidding process till the selection of the bidder. Monitoring Committee to be formed comprising of CMOs of all the ULBs of the cluster headed by lead member, for taking decision for monitoring of the project.

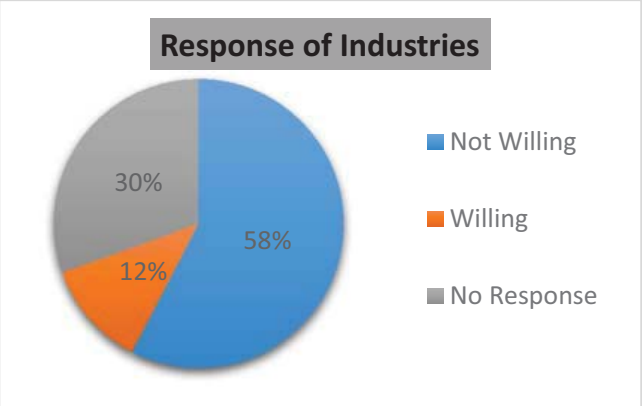
Factors considered for formation of cluster are-

- Distance between towns
- Quantity of waste
- Project Cost
- Economies of Scale
- Affordable user charges

Madhya Pradesh model of cluster level dry waste management is based on single agency monitoring system where the State Government plays a crucial role of cluster formulation ad later of monitoring the proper functioning through the 'monitoring committee'.

7. Plastic Recycling Industries of Maharashtra

There are close to 386 industries in Maharashtra which recycle plastic waste. Out of these industries, 74 are registered with MPCB (Maharashtra Pollution Control Board). Most of the industries are located in Konkan and Pune division and some are located around Malegaon city in Nashik division.



For this study industries registered with MPCB are considered. Initial assessment through discussion was conducted with these 74 industries to understand the willingness and possibility of the industry to be included in the cluster. The initial assessment revealed that out of the total 74 industries registered with MPCB only 9 industries willing to accept plastic waste from the ULBs. These 9 industries are spread in the 4 revenue divisions of the state- Konkan, Nashik, Pune, Amravati and Nagpur.

8. Criteria of Industries for Accepting Plastic Waste

The concept of cluster level dry waste management was shared and discussed with the identified nine industries which are willing to accept plastic waste

from Urban Local Bodies (ULBs). Detailed interviews/ meetings were conducted with these 9 recycling industries to identify the criteria to be considered for the industries to be part of the cluster. Following is the summary of criteria listed by industries in order for them to be part of the cluster level dry waste management-

- The location of the city should be within the distance of 200 kms from the industry.
- ULBs should ensure collection of agreed quantity of plastic waste at a fixed frequency.
- Plastic should be segregated in to PET bottles, HDPE, LDPE, PP and HM by the ULB.
- Plastic waste should be washed by the ULB (Should not be soiled by organic waste) as industries are not equipped with washer facility.
- Plastic waste should be bailed so as to fit in more quantity during transportation.
- Industries are willing to bear the transportation cost subjected to a certain quantity of waste which should be assured by the ULB
- Industries are willing to receive plastic waste from ULBs at the current market rate. The rates are as follows-
    - Low grade- Rs. 15/- to 18/- kg
    - Medium grade- Rs. 25/- kg
    - High grade- Rs. 30/- kg
    - PET Bottles- Rs. 33/- kg

9. Selection of Cities for Cluster Formation

The nine industries willing to accept plastic waste from cities are from Pune, Konkan, Nashik, Amravati and Nagpur division. As per the data received from the Ministry of Urban Development, Maharashtra cities of Pune, Konkan, Nashik and Nagpur division have better performance in waste segregation, hence as a pilot study clusters have been identified in these four divisions. Procedure for identification of clusters can be replicated for other divisions.

The cities with more than 80% of segregation and within the preferred distance from the industry is further assessed to understand their potential to be included in the cluster. The cities were assessed to understand the existing infrastructure and on the factors listed by industries as mentioned above. The cities were assessed on key factors like-

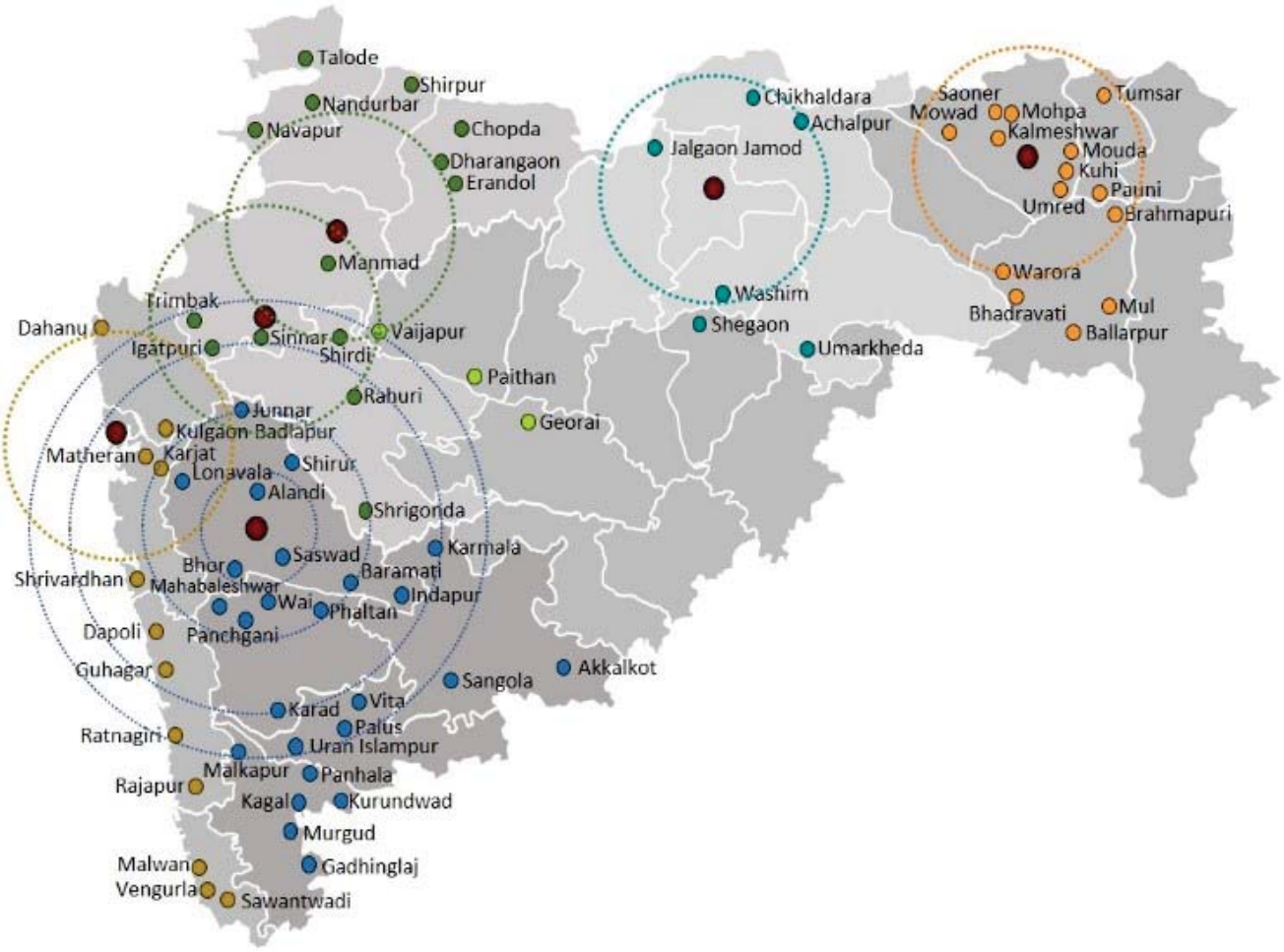
- Availability of labor for segregation- As the industries require segregated plastic waste, it is essential that the ULB has adequate staff for conducting segregation of waste.
- Availability infrastructure at SWM processing site-

  The ULBs which will be part of the cluster will be required to segregate and store plastic waste. Hence, ULBs are assessed based on the availability of adequate infrastructure at SWM processing site.

Table 2: Number of Cities with above 80% Segregation in Maharashtra (Division wise)

SN	Division	No. of industries	Distance from the industry (kms)	Qty. of waste recycled (TPD)	No. of cities with >80% segregation within the distance
1.	Pune	1	200	2.8	19
2.	Konkan	1	100	1	10
3.	Nashik	2	150	2.2	10
4.	Nagpur	1	100	1	14

Figure 1: Cities with 80% Segregation with Location of Recycling Industries Buffer



- Type and quantity of plastic waste available with the city-

  Each industry recycles only a certain type of plastic waste i.e. PET, LDPE, HDPE etc. Furthermore, as per industry's capacity, assurance of waste quantity and frequency needs to be ensured. Hence, cities of the cluster are identified if they can collect and segregate the type and quantity of plastic waste required by the industry.

- Current stakeholder involvement for dry waste processing-

  The ULBs current waste management practices are assessed to identify the gaps and study the probability of fulfilling the criteria to be part of the cluster.

- Willingness of the ULB to share transportation cost

  The industries are willing to accept waste from the cities located at the distance of 200 kms provided that the ULB bear partial cost of transporting the waste to the industry. Hence, the ULBs willingness for the same is assessed.

10.Cluster Formation

As mentioned above the industries willing to accept plastic waste from the ULBs are from Pune, Konkan, Nashik and Nagpur division. Hence, clusters of Pune, Konkan and Nashik have been formed as pilot study. Presented below is the example of Pune division cluster

- Capacity of the industry located at Pune- 1 MT/day
- Distance industry is willing to travel for waste collection- 100 kms
- No. of ULBs with >80% segregation within the buffer of 100 kms.- 18

Initial assessment of the 18 cities was conducted to understand the current situation of dry waste management and willingness of the city to be part of the cluster. Based on the initial assessment, site visit to 6 cities was conducted. Observations from the site visits are as mentioned in the table below-

Table 3: Observations from Site Visits for Pune Division Cluster

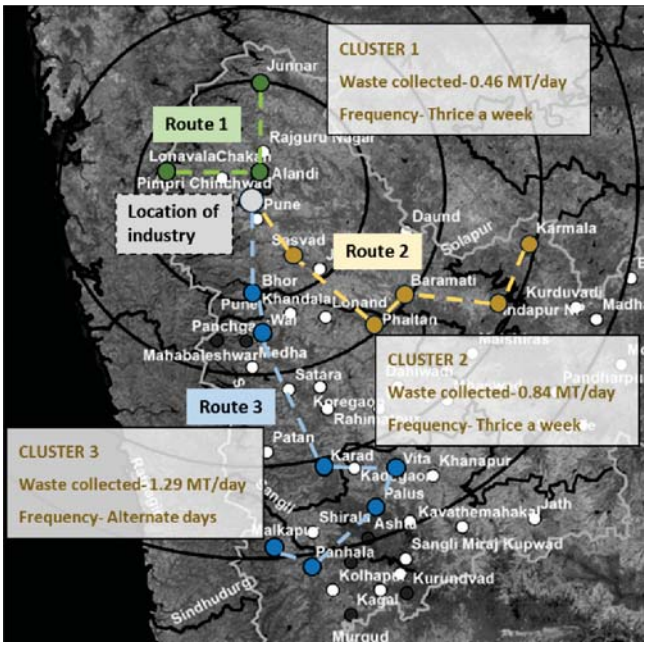
Cities	Dry waste generation (MT/day)	Seg (In %)	Availability of manpower for segregation	Available infrastructure	Type of segregated dry waste available	Current management of dry waste	Willingness of ULBs to be part of cluster	Willingness to share transport cost	Potential to be included in cluster
JUNNAR	2	100	ULB workers segregate waste	Shed -sorting and storage	Secondary segregation is not undertaken	PET bottles taken away by waste pickers. Plastic waste given to an industry	Yes	No	Yes
ALANDI	9	83	Waste pickers integrated in the system segregate waste	Shed -sorting and storage	LDPE, PET bottles, clothes, footwear	Waste pickers sort waste. Contractor pays them	Yes	Yes	Yes
SASWAD	5.5	100	ULB workers segregate waste	Shed -sorting and storage	PET bottles and LDPE plastic	Waste pickers sort waste which is sold by contractor	Yes	No	May be
URAN ISLAMPUR	2.5	100	Waste pickers segregate waste	Shed -sorting and storage	Secondary segregation is not undertaken	Waste pickers sell the sorted waste. ULB in talks with a plastic recycling industry	Yes	Yes	May be
KARAD	13	100	Waste pickers segregate waste	Shed -sorting and storage	Secondary segregation is not undertaken	Waste pickers sort waste and sell it. ULB in talks with a plastic recycling industry	Yes	No	Maybe
PANHALA	0.5	100	Waste pickers integrated in the system segregate waste	Shed -sorting and storage	glass bottles, PET bottles, LDPE plastic, footwear and leather	Waste pickers segregate and store waste in dumpsite	Yes	Yes	Yes

As per the observations from site visits and discussion with the ULBs and industries, clusters were identified for Pune division. The clusters are characterized by the willingness of the ULB to be part of the cluster, waste generated by the city, route and frequency of waste collection.

Cities inside the buffer of the distance industry is willing to travel for waste collection are considered for further analysis to be part of the cluster. From the observations from the site visits and the discussions with the industry and the ULB officials cities which have potential to be part of the cluster were identified. The key parameters on which potential of the city to be part of the cluster was assessed on current waste management practices undertake by the city, availability of manpower for segregation, availability of infrastructure, segregation undertake in the city and willingness of the ULB to share transportation cost.

Based on the location of the industry and the identified cities, 3 routes for waste collection were identified for Pune cluster. Waste collection

Figure 2: Cluster Formation and Route Mapping for Pune Division



frequency for each route is calculated as per the waste processing frequency of the industry and waste generated by all the cities in each route. The following map shows the 3 clusters spatially on a map.

Similar approach was undertaken for identifying clusters of Konkan and Nashik division and can be further undertaken for other divisions.

11.Inference

During the initial discussions held with the industries followed by the discussions held on the observations of the site visit, certain parameters were identified which are crucial for the implementation of the cluster level dry waste management. These criterias need to be addressed by multiple stakeholders of the system like the ULBs and State. The key parameters that affect the feasibility of the cluster were identified as follows:

1. Availability of required infrastructure-

   - As recycling industries need unsoiled and washed plastic, ULBs need to have system and infrastructure in place to meet the quality requirement of the industries.

   - To get unsoiled plastic, ULBs need to implement at source segregation for plastic waste and make provisions for collecting plastic waste separately.

   - Appropriate space has to be made at processing site for further segregation and storage of plastic waste. 10/19 cities visited did not have appropriate space for waste segregation and storage.

2. Involvement of stakeholders-

   - In 8 cities out of 19 visited cities waste pickers take away recyclable dry waste before it reaches processing site. Hence, ULBs need to integrate waste pickers for proper management of dry waste.

   - In 5 cities out of 19 visited contractors are appointed for undertaking dry waste management. These ULBs are willing to be part of the cluster but need enabling administrative setup for the same.

3. Administrative mechanism for working of a cluster-

   - To ease the collection of segregated plastic waste from different ULBs of the cluster a regional facility in one of the cities of the cluster should be developed to act as a single collection point for the industry. Adequate infrastructure should be developed at the identified ULB to act as a regional facility.

   - To monitor smooth functioning of the cluster and facilitate coordination between the cities and the industry a monitoring authority should be appointed to act as a link between the cities and the industries.

- To be part of the cluster recycling industries need to have formal association with the ULBs and the State. Hence the identified industry needs to be formally integrated in the system by the State government.

- As observed through the case studies and discussions with various stakeholders, State Government plays a crucial role in the cluster level dry waste management system by monitoring smooth functioning of the cluster and facilitating coordination between the cities and the industry.

4. Quantity and quality of waste-

    - Industries need assurance of the quality and quantity of the waste to be collected, hence, ULBs need to conduct quantification of plastic waste arriving at the dumping site.

5. Transportation cost-

    - ULBs which already have forward linkages are not willing to share transportation cost. 8 cities of total 19 visited are not willing to share transportation cost, hence State's directive on the same are needed.

❑ ❑ ❑

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ICT in Women Entrepreneurial Firms

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Abstract:

Technological advancement, the adoption of digital marketing and incorporation of digital platforms and websites have fundamentally changed the entrepreneurial landscape especially from a gender based perspective globally. Entrepreneurship has emerged as an invaluable tool for economic empowerment of women. Information and Communication Technologies (ICTs) have improved the way businesses are run while creating new avenues for empowering entrepreneurs especially women. In the context of developing countries, due to the fact of digital divide as well as digital exclusion women have disproportionately less access to ICTs and digital opportunities and they are less equipped to avail the benefits that ICTs offer. Despite a sporadic boom of ICT applications by women entrepreneurs, scholarly research of the social-economic implications on women entrepreneurs is limited. In this paper, we review literature on ICT on empowerment of women, focusing on their motivation and barriers in ICT usage. Several initiatives undertaken by different institutions to empower the women entrepreneur via ICT have also been studied. We anticipate that the insights generated from this review will be useful for effective program development and policy design.

Keywords: Women Empowerment, Women Entrepreneurs and Mobile Phone Technology

Introduction

Women's financial progression and entrepreneurial activity is supported through Information and Communications Technologies (ICTs), which include mobiles, computer devises and the Internet, which enable women entrepreneurs to experience advanced business practices, and severing gender barriers imposed due to tradition in both the social and economic spaces. Information and Communication Technology (ICT) is increasingly being incorporated in businesses of all sizes.

ICT has proven, to be a valuable contribution for solving development related issues and problems of society, and enabling perform successful tasks in Agriculture, Education, Industry, Banking, Governance, Business, Health, Tourism, etc. in rural and urban areas of the country and hence ICT becomes a popular tool for all human beings in rural and urban society. However, while the developmental impacts of ICTs are widely explored and further potential is being constantly realized, a major part of the world population remains lagging behind in the race (ADB, 2014). The disparity or the so called 'digital divide' between developed and developing countries when it comes to reaping the fruits of ICTs has been one of the much discussed issues in the global arena.

When it comes to utilizing benefits of ICTs, consideration of women is always crucial as women are less likely to derive the benefits from

ICTs whereas ICTs have largest potential to benefit women (UNCTAD, 2014). Among ICTs, Mobile technologies usage by women entrepreneurs has dramatically increased as valuable business tools and continues to increase in developing economies (GSMA, 2017).

In today's technologically advanced world, ICT has initiated a large number of changes in several spheres. ICT also needs to be popularized within existing cultural and social structures without inadvertently reinforcing existing gender divides or resulting in further marginalization. With this broader objective in view, this paper does a brief survey of literature on the relevant issues and presents how ICTs can be used more effectively to facilitate empowerment of women entrepreneurs by overcoming existing bottlenecks and building on the on-going institutional and government initiatives. Finally it makes some recommendations.

Women's Empowerment through ICTs

According to Kretschmer (2012), empowerment of women necessitates transformation of labour division as well as changes in ideologies prevalent on the roles and responsibilities of women and men. It has been widely argued that economic empowerment of women is one of the main weapons against eradicating poverty and achieving gender equality for sustainable economic development (UN, 2010). In this regard, promotion of entrepreneurship among women is a key measure for ensuring women's economic empowerment where ICTs are playing and can further play decisive roles. Empowerment helps achieve practical as well as strategic gender needs by enhancing self reliance among women and acknowledging power dynamics rooted in gender, class, ethnicity and age. Malhotra et al. (2002) in their view argue that 'empowerment' has been used to advocate more often for certain types of intervention strategies and policies than to analyze them. This is demonstrated by a number of documents from the United Nations (UNDAW, 2001; UNCEF,2009; UKDID, 2000), and other organizations. Although, women constitute half of the total population in developing countries, their contribution to GDP is very insignificant compared to not only their male counterparts but also in comparison to the contribution of women in more developed countries. Use of Information and Communication Technology (ICT) can play a very enabling role in unlocking the potential of women in general and women entrepreneurs in particular. ICTs also appear to have much potential for rural women who lack access to business related information, services and opportunities which accelerate the growth of the economy by engaging women in productive activities and importantly it can also contribute to economic empowerment of women in the country.

Experience in Africa, Asia and other regions shows that ICTs, particularly mobile phones, save time and generate income for women and low income population (Lesotho), mobile money facilitates business activities of women entrepreneurs (the United Republic of Tanzania), ICTs promote networks among rural women (Uganda) (UNCTAD, 2014) ICT in general and mobile phone in particular has changed the way women entrepreneurs work, consume, purchase and interact. The women entrepreneurs in the Middle East and North Africa use ICT for their businesses at rates well above the per capita average worldwide. Thus women are extensively using ICT in making successful business ventures. But many women businesses are still missing the huge potential benefits of using ICT as a part of their business enhancement (Ikiara, 2001).

This has resulted in some of them, despite being in the market for long, being overtaken if not edged out of the business by those that utilize mobile telephony because they are unable to achieve their set business goals (Svanaes, et al, 2010).

Empirical Evidences

Literature review provides coherent picture of the study. It is helpful for proper planning for conducting study. The review of past investigations in particular area gives guidelines to the investigator to carry out study in that area.

ICT adoption in business has been put under theoretical scrutiny by previous scholars who have examined their determinants with regard to cultural differences. Other scholarly inquiry into the use of ICT in business focused on the difference between rich and poor countries regarding access to technologies available to their inhabitants. ICTs are increasingly promoted as a key solution for comprehensive development, poverty eradication and the empowerment of backward groups, such as women and minorities in the Global South (Bhatnagar & Schware, 2000; Friedman, 2005).

Papatathopoulos and Beneki, focused on the types of SMEs that benefited from the adoption of ICTs in the Greek SME sector. The study found how some SMEs reaped more benefits than others from the adoption of ICTs and which factors determined the successful usage of ICTs. Alam, Jani and Omar, carried out a study on the success factors of women entrepreneurs in Southern Region of Malaysia. It was discovered that innovation through ICT has no direct effect on the success of women entrepreneurs in Malaysia.

Aleke, Ojiako, Wainwright, carried out studies on the diffusion of e-commerce technology to small scale agribusiness in Nigeria. The empirical evidence suggests that ICTs and other related technologies are increasingly emerging in the communities of the developing economics such as Nigeria. It was discovered that rural actors engaged in agricultural industries felt that the implementation of ICTs could influence the development of new business processes and the way existing processes are organized. The research motivated the South East State Government in collaboration with the Federal Government to give closer attention.to their process of making Nigeria an ICT-enabled country.

The main drivers of this trend are improved business practices, increased competition and performance and new business opportunities (Komunte, Rwashana, & Nabukenya, 2012: 82). A few recent studies show that the number of women involved in the small and micro enterprises is increasing in Bangladesh (ILO, 2008). Although women have been engaged in different types of jobs in traditional sectors as well as in a number of self-employment activities, they are less likely to get benefits from existing or new technologies. For instance, a study shows that in Bangladesh women mostly (37 per cent) used production methods which are traditional and purely manual than men (22 percent) whereas more men (17 per cent) than women (9 percent) used modern and productivity enhancing technologies (Marcucci, 2001). It can sensibly be argued that this pattern is also similar in the use of ICTs for productive purposes. According to Habibullah (1987), training plays very effective role for development of entrepreneurship in general, but there are other issues, as showed by Saleh (1995) that constrain development of entrepreneurship among women such as insufficient capital, marketing deficits and discrimination in receiving required services from different agencies.

Studies show that women are late adopter of technology i.e. mobile phones and they are less equipped to use ICTs for development purposes (Martin and Abbott, 2011). It has been emphasized that integrating ICTs in the lives and livelihoods initiatives of poor women can have positive impacts for economic and social development by providing them with more market opportunities. Examples of Self-Employed Women's Association (SEWA) in India, the Grameen's Village Phone Program in Bangladesh and business collectives

like the Tortas bakers in Peru showed how poor rural women have successfully utilized ICTs in different ways (USAID Bangladesh, 2005). However, relatively less is known about how ICTs could be utilized to benefit women entrepreneurs in low income country like Bangladesh, India, and Kenya. A study of McClelland et al. (2005) showed that the women entrepreneurs in Canada, Singapore and Ireland utilized networking as a means of business development. Innovation through Information Communications Technology (ICT) played an important role in supporting their business by gaining a low cost structure and achieving higher returns per customer (Marlin & Wright, 2005). According to Ndubisi and Kahraman (2011), the importance of ICT to women entrepreneurs cannot be undermined. If in the past women had to deal with men personally and face to face, business through the Internet does not require this aspect. Demographic factors like age, gender and background are not as obvious in cyberspace as in the real world (Marlin & Wright, 2005). Increased agency and self-confidence allow women to travel more and develop a wider network of contacts. Such travel and networking expose them to the availability of more economic opportunities (Rice, 2003).

ICTs can be a valuable tool for the organization and mobilization of women's advocacy and interest groups (Nath, 2006). Sharma (2003) argues that "societies that discriminate by gender pay a high price in terms of their ability to develop and to reduce poverty", an assertion that has been supported by every annual United Nations Human Development Report since 2001 (UNDP, 2001–2006). ICT provides women entrepreneurs with access to worldwide e-business channels, which can be operated 24/7 from home in real-time (Hilbert,M. 2011). Nugroho and Chowdhury (2015) also stated that women entrepreneurs from Muslim countries such as Indonesia had difficulties in conducting business activities outside of their house due to domestic responsibilities. This limitation of women entrepreneurs (domestic responsibilities of women especially those who are married or having a family) caused women entrepreneurs difficulties in business performance. Therefore, ICT adoption plays an important role in enabling women entrepreneurs to overcome their limitations (Nugroho & Chowdhury, 2015). The introduction of new ICTs has brought new hopes to women entrepreneurship in the Malaysian economy (Ndubisi and Kahraman 2006; Duncombe et al. 2005). ICT has a significant impact on the operations of SMEs and is essential for the survival and growth of nations' economies in general and of SMEs in particular.

Factors Motivating the Usage of ICT

Adoption of ICT is generally defined as uptake and use of Information and Communication Technologies such as computers, mobile phones, websites, internet and other wireless communication devices and networks, (datum and Mogotetsi, 2010)

The adoption of ICT in enterprises is influenced by a number of factors. In terms of business enterprise the most significant of these is profit. Women entrepreneurs are being induced to incorporate ICTs in their businesses to manage the operations. The extensive uses of ICTs are changing companies' work culture. Modern and advanced ICT tools are very powerful in delivering quality and contributing towards financial growth and progress. The adoption or non adoption of e-commerce, m commerce or social media is having direct impact on their survival or failure. ICT is used to share, exchange and transfer knowledge and it can be used to improve the ability of organizations, the economy and individuals. The use of ICT allows women entrepreneurs to engage in growth and development of the national economy like their male counterparts (Mathew, 2010). ICT increases productivity, improves job performance and enhances job effectiveness in any

businesses. ICTs allow women entrepreneurs to sell their products in the most profitable markets. Moreover, ICT usage helps women entrepreneurs equally take part in today's business world (Mathew, 2010). Martin and Wright (2005) pointed out the scarcity of literature regarding women ICT entrepreneurship and proposed further research on that topic.

Barrier to ICT Usage

The ICT sector is now a growing sector for employment, and a key factor for both national and regional development. Without the adoption of new technologies, there is very limited scope for the nation as well as a region to develop. Women entrepreneurs are still unable to completely tap the potentialities of ICT for the development of their business in the developing countries.

However, in the milieu of 'rapidly changing ICT landscape' a number of factors related to infrastructural development, institutional, legal and socio-cultural gender norms have been disproportionately hindering the potential of women entrepreneurs. Women are still not conversant enough to use ICT in their businesses. This is due to the social norms and non-availability of adequate knowledge about computers. Availability of network infrastructure is also a major challenge among women entrepreneurs.

The main barriers in using ICT in businesses are lack of training, lack of access, the high costs of equipment, connections, hardware and software applications It covers entrepreneurial challenges related to socio-cultural conditions, the policy and regulatory environment, access to finance, and capacity development. Lack of adequate financial resources places significant constraints on micro enterprises development in terms of new technological adoption in their operations. According to Ongori, (2009), financial constraints are a major determinant to ICT adoption among women managed SMEs.

The absence of adequate knowledge of technologies also poses a challenge for women entrepreneurs. Language barrier is another important factor. Most of the sites use English as a medium for communication and women are mostly familiar with the local language.

The Increasing Use of ICTs by Women Entrepreneurs

In today's technologically advanced world, ICT has initiated a multiplicity of changes in several spheres. ICT has become a key solution for comprehensive development starting from poverty eradication and empowerment of minority groups, such as women and minorities in Global South.

ICTs are consistently hailed as one of the most .effective tools for economic development.

E-commerce, which involves the buying and selling of goods and services on the Internet or other electronic platforms, is making it possible also for micro-entrepreneurs to engage in trade by creating 'virtual storefronts' on websites with online catalogues to support marketing or sales of their products to the global market.

This is a capacity which was previously largely confined to larger companies. When used effectively, ICTs can enable women entrepreneurs to achieve greater levels of profitability by refining internal processes. In many low-income countries, the use of a mobile phone has allowed women entrepreneurs in diverse sectors to save time on travel, expand outreach, receive orders and in some cases transfer money too.

Institutional Initiatives for ICT Development among Women Entrepreneurs

ICTs are valuable enabling tools for socio-economic development, social participation and empowerment, yet specific segments of the population continue to face disadvantages resulting

from their lack of access and capacity to use these technologies. However, the potential of ICT as a technology tool for promoting micro-enterprises by poor women is still unused in many countries. ICTs, in particular mobile phones, the internet, and computers, play an important role in accelerating business growth In order to bridge this digital divide and to help address the gender gaps that remain, the United Nations Asian and Pacific Training Centre for ICT for Development (UN-APCICT) has developed the Women and ICT Frontier Initiative (WIFI) to support women entrepreneurs with fundamental knowledge of business management, ICT skills and online resources The governments of Azerbaijan, Kazakhstan, the Kyrgyz Republic, and Uzbekistan appear to recognize the importance of ICTs for business and some are making significant investments in projects that improve ICT infrastructure.

In Bangladesh, under the Government Digital Bangladesh policy and the thrust sector initiative, an atmosphere exists for accelerated growth and meaningful engagement through active interaction and transforming the country into medium income economy and to achieve Vision 2021 by ensuring the full participation of women in economic activities. Inspite of the immense scope for training in this field, there has been little attempt to overcome the obstacles of women's access to ICT. In recent years, World Bank and Canadian International Development Research Centre (IDRC) have increased the funding on ICT projects that are specifically aimed to empower women (Maier and Reichert, 2008). Several e-commerce projects have become popular in global markets. The Georgetown-initiated Cottage Industry-Global Market CI-GM Project, Tortas Peru, EthioShop, the Indian Shop and the Rupununi Weavers Society are examples.

In India, Government promotes continuous training programmes and awareness workshops on the use and potential of ICT throughout the country. Aamagaon Soochna Kendra (My village's information center) is a project undertaken by Government of Orissa for setting up 73 Information and Communication Technology (ICT) kiosks in the rural areas of 12 districts of Orissa. Under a partnership with Mission Shakti, women SHG members are being trained on computer fundamentals and internet basics at the IT Kiosks on payment of an affordable fee. E-Seva project run by the West-Godavari District Administration in Andhra Pradesh State of India, has established ICT enabled rural e-Seva centres.

These centres are run by Helf-Help Groups of women from the poorest segments of society. Considerable numbers of these centers are under the control of women Self-Help Group or youth Self Help Group (SHG) members. E-Seva project helped in women empowerment and also developed them as role models in bringing change in their communities through the use of ICTs in establishing knowledge hubs in rural areas.

Government of Kerala, and NABARD (National Bank for Agriculture and Rural Development) have jointly implemented the Kudumbashree, with an aim to eradicate poverty from the State with a special focus on women and children from Below Poverty Line (BPL) families. Women were motivated to set up their own micro enterprise after obtaining training in data entry, data processing, desktop publishing (DTP), and IT education. Entrepreneurship Development training was imparted to them under the Kudumbashree project. The first micro-enterprise unit was started in Trivandrum on 15, September 1999. The unit was named as Techno World Digital Technologies.

FOOD (Foundation of Occupational Development), a 20-year-old nonprofit organization based in Chennai promoted online shopping website called India Shop. This is a form of ICT based ecommerce website. This website is a successful online shop that sells indigenous products such as sarees, leather goods, sculptures, and other handicrafts made by rural artisans and women cooperatives in Tamil Nadu. This project seeks to encourage economic empowerment of the rural and urban poor women.

In Gujarat, women dairy producers use the Dairy Information System Kiosk (DISK), which manages a database of all milk cattle, provides information about veterinary services and other practical information about the dairy sector. This information helps women producers maximize productivity and earnings. In Kerala, a team of six women have formed an IT based training programme called Divine Computers at Azhiyur Secondary School in Vadakara. This training programme was launched with the support of Kerala government, to deliver computer education to school students at subsidized rates.

The 'Inter-city Marketing Network of Women Entrepreneurs' project in Chennai, India has set up a communication network among women's community-based organizations (CBO) The CBOs are provided with cellular phones, and women have been trained to market their products through telephones and sell the same not only in their neighborhoods' but also in potential markets in the city. With the use of this technique, poor women from CBOs who are constrained by pressure of time and mobility are able to assess the aggregate market demand by communicating with their peer CBOs.

Although, the Governments of developing countries have started taking initiatives to educate women on ICT tools, the implementation of most programmes has been slow.

Conclusion

Information and Communication Technology has created immense opportunities to be harvested with greater possibility and ease of reaching the hitherto underserved or excluded sections of the society such as women, rural population and marginalized communities. ICTs, in particular, mobile phones, the internet, and computers, play a major role in accelerating business growth. Women entrepreneurs are still unable to completely tap the potential of ICT for the development of their business. In order to ensure that people from all segments of society can take benefits of modern ICTs, it is important to understand how existing constraints prevent many from getting those benefits and why a few others are even excluded from the entire picture.

In particular, integrating the use ICTs for promoting women entrepreneurship in the economy not only would drive economic growth, but also contribute significantly to ensure empowerment of women through increased entrepreneurial activities and their economic independence. It is emphasized that ICTs can be used more effectively to facilitate empowerment of women entrepreneurs while overcoming existing bottlenecks and building on the on-going institutional, government and private sector initiatives. For this, both targeted and broad-based measures are required to create conducive policy environment and other conditions that adequately take into account issues of women's access, usage, ownership, needs and relevance of digital contents and platforms in order to leverage ICTs for promoting women entrepreneurship. To better integrate ICTs for helping women entrepreneurs, more in-depth studies are needed with regard to sector specific exploration about women entrepreneurship development under the framework of overall economy of country.

Gender gap in the digital world is still much prevalent in the developing countries. Hence,

Government should come up with special policies and schemes on financial support, infrastructural support and training facilities in schools to promote and develop the usage of ICT among women entrepreneurs both in rural and urban areas to make them independent. The Governments of various countries and sub national governments seem to perceive the significance of ICTs for business, and some are taking steps to promote their use among women and weaker segments too.

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Transformation of Women at Work in Asia: An Unfinished Development Agenda[1]

Book Review

Reviewed by **Gayatri Sharma, Programme Director,**
Women Power Connect, Delhi.

The issue of declining female labour force participation is presently of concern to those working in the development sector and engaging with issue of gender in India. In India, the female labour force participation declined from 34.1% in 1999 – 2000, to 27.2% in 2011-2012. Various explanations have been put forward for this puzzling trend, including patriarchal norms, sexual harassment at the workplace, and scarcity of suitable options. A comprehensive economic analysis providing the larger context in Asia is now available in the SAGE publication "Transformation of Women at Work in Asia: An Unfinished Development Agenda" edited by Sukti Dasgupta and Sher Singh Verick.

For those working on issues connected with gender, women's rights and development, it is worthwhile to note that participation of women in the labour force has either fallen or remained stagnant in a number of countries in Asia (and not just in India). While female labour force participation has overall declined in East Asia and South Asia, it has remained stable in South East Asia and the Pacific. This volume notes that across Asia (including countries where there is parity in the labour force participation, such as Cambodia and Nepal), women tend to earn less, work in less productive jobs and are over represented in unpaid family work.

In the introduction, Dasgupta and Verick explain that the scope of this volume is to tackle two interconnected phenomena. First, women's empowerment and gender disparities in the labour market and second, the extent and nature of economic transformation and structural change that countries in Asia have experienced in recent decades. Within this framework, the volume seeks to answer two questions: First, what has been the role of women in the process of economic transformation in Asia? Second, to what extent have women gained from the transformation witnessed in the region? The countries covered in this volume are categorized into three; low to middle income and low female labour force participation (Bangladesh, India and Sri Lanka), low to middle income and high female labour force participation (Cambodia), and middle to high income and medium female labour force participation (China and Indonesia).

An interesting finding noted in this volume is that the "U shaped hypothesis" (an argument that women work when a country is either poor, out of necessity, or in high income countries where wages for women are also high) is not yet evident in India, and not evident in Bangladesh. In Bangladesh, a low income country, there has been an increase in female employment. However, it is primarily the garment industry that employs women and other sectors have not emerged as significant employers of women. In India, the primary reason for decline in female participation in the workforce is lack of

[1]*Sukti Dasgupta and Sher Singh Verick (Editors), New Delhi, Sage Publications India Pvt. Ltd 2016, Number of Pages: 312, Price: INR 1045, ISBN Number: 978-93-859-8505-8*

employment opportunities for women, partially owing to inadequate job creation in the vicinity of where women live and occupational segregation, along with other factors.

This volume comprises articles looking at both the macro picture in Asia (Barcia de Mattos, Chaudharty, Kelkar); and more local specific scenarios (for example, Saha, Verick, Mehrotra and Sinha examine specifically the declining female employment in Gujarat and Uttar Pradesh in India). The stagnation of women's participation in Sri Lanka is analyzed by Gunatilaka, while Chandararot and Dannet point out that although Cambodia's female labour force participation is one of the highest in the world, women remain in low-pay and low-productivity jobs. Matsumoto looks at women's participation in the workforce in Indonesia, while Dasgupta, Matsumoto and Xia note that even as the Chinese economy grows, barriers remain for women workers.

Overall written in language that can be easily understood by non-economists, the articles in this volume manage to explain the complexities in understanding women's workforce participation. The volume cautions against drawing simplistic conclusions with regard to women in the workforce and gender equality. Simply increasing the female workforce participation without ancillary changes in policies and occupational segregation will not give women greater empowerment. For example, Kelkar refers to an interesting study highlighting how when men are employed in traditionally female occupations (for example, nursing or teaching) they spend more time doing housework. Further, when married women or women in live-in relationships are employed in traditionally women's jobs, they tend to increase the amount of time spent on housework and caring compared to when they are employed in traditionally male occupations.

While the economic complexities in women's workforce participation in Asia are well explained through use of data and research, the laws regulating women's labour, and inadequacies and difficulties in implementation of laws and policies have only been touched upon. For example, the anti-sexual harassment at the workplace laws in each country or what are the different maternity benefits available have not been dealt with in this volume.

This volume will be of great help to those engaged with the issue of women and work, and will help sharpen analysis of the problem, and the tools required to draw attention to the problem. For example, advocacy in India should focus on job creation for women without occupational segregation. Lessons can be drawn from China, where although women have benefited from the high rate of economic growth, gender disparity remains in the workforce. Cambodia and Nepal also present a cautionary tale as high rates of female labour does not translate into women's equality or fair conditions of work.

The volume also highlights a number of similarities faced by women in Asia – disproportionate amount of housework and childcare to burden, patriarchal norms, and the lack of women's representation in economic governance. Change in male attitudes towards household work is important in all countries of Asia. Gender stereotyping at the workplace is also common across the region and it is necessary to incentivize firms to change gender norms. This volume provides food for thought for the “how to” of bringing about change in women's workforce participation and will be welcomed by both economists and non-economists alike.

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Urbanization in India-A Brief Overview

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In India, as elsewhere in the world, urbanization is in a roll. According to UN (UN-DESA 2018) presently, 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050. Basically, urbanization is a shift of human population as a section of rural population keeps on moving and settling in cities for various purposes- for employment, business, learning, a better way of life, culture, etc. In the modern times, cities have enormously grown in size and dimensions. Urbanization is much more than just shift of sections of population from rural to urban. Cities have their own settings and city life has its own characteristics. A quote of Li Kegiang beautifully epitomizes the process- "Urbanization is not about simply increasing the number of urban residents or expanding the area of cities. More importantly, it's about a complete change from rural to urban style in terms of industry structure, employment, living environment and social security." In India, cities are taking all the limelight, but the fact remains that India has all along been a predominantly rural country. According to the Ministry of Housing and Urban Affairs, India is in the midst of transition from a predominantly rural to a quasi urban society. The following statistics demonstrate this fact.

Urban Population in India, 1901-2011

Census Year	Number of UAs/ Towns	Total population (in millions)	Rural Population (in millions)	Urban Population (in millions)	Urban Population as percentage of total Population.
1901	1,830	238	213	26	10.8
1911	1,815	252	226	26	10.3
1921	1,944	251	223	28	11.2
1931	2,066	279	246	34	12.0
1941	2,253	319	275	44	13.9
1951	2,822	361	299	62	17.3
1961	2,334	439	360	79	18.0
1971	2,567	548	439	109	19.9
1981	3,347	683	524	160	23.3
1991	3,769	846	629	218	25.7
2001	4,378	1,027	742	285	27.8
2011	6,507	1,210	833	377	31.2

Source: Census of India.

First half of 20th century was an eventful period for India. Western secular education was finding its way in India, universities and courts were being set up, freedom movement was gaining momentum, British administration was laying down infrastructure in the form of railways, etc. In spite of these mass changes taking place the rate of rise in urban population was very steady, limited to being just about 0.9% of decadal growth. After Independence, when India embarked on the path of Planned Development with launch of infrastructure and industrial development activities that the rate of urbanization picked up a little i.e. between 1951 and 1971 we had about 1% rise in decadal increase in urban population. The highest rate of growth in urban population was recorded in the two decades - 1971-1981 and 2001-2011 with a decadal growth of 3.4%.

State-wise Growths in Urban Population 1971 – 2011

SI. No	States	Percentage urban population					Between 1971-2011
		1971	1981	1991	2001	2011	
1	Andhra Pradesh	19.31	23.25	26.84	27.08	33.49	14.81
2	Assam	8.82	9.88	1.09	12.72	14.08	5.26
3	Bihar	10.00	12.46	13.17	10.47	11.30	1.3
4	Gujarat	28.08	31.08	34.40	37.35	42.58	17.2
5	Haryana	17.66	21.96	24.79	29.00	24.25	6.59
6	Karnataka	24.31	28.91	30.91	33.98	38.57	14.26
7	Kerala	16.24	18.78	26.44	25.97	47.72	31.48
8	Madhya Pradesh	16.29	20.31	23.21	26.67	27.63	11.34
9	Maharashtra	31.17	35.03	38.73	42.40	45.23	14.06
10	Orissa	8.41	11.82	13.43	14.97	16.86	8.45
11	Punjab	23.73	27.72	29.72	33.95	37.49	13.76
12	Rajasthan	17.63	20.93	22.88	23.38	24.89	7.26
13	Tamil Nadu	30.26	32.98	34.20	43.86	48.45	18.19
14	Uttar Pradesh	14.02	18.01	19.89	20.78	22.28	8.06
15	West Bengal	24.75	26.49	27.39	28.03	31.89	7.14
ALL INDIA		20.22	23.73	25.72	27.78	31.16	

Source: Census of India

The above table inter alia shows that at present Tamil Nadu is the most urbanized State in India followed by Kerala, Maharashtra and Gujarat, etc. The States of Punjab, Haryana, Uttar Pradesh and Bihar with their rich soil and availability of water for irrigation have held better proportion of their population in villages.

Urban Agglomerations

Some cities have grown exponentially on account of various factors. As a city grows bigger, contiguous areas around its limits also grow which are called with various names like peri-urban areas, urban fringe, suburbs, etc. Various satellite towns

around main cities have been developed to bring about balanced development of the region. This has given rise to the concept of Urban Agglomeration. According to Census India 2011.

"An urban agglomeration is a continuous urban spread constituting a town and its adjoining outgrowths (OGs), or two or more physically contiguous towns together with or without outgrowths of such towns. An Urban Agglomeration must consist of at least a statutory town and its total population (i.e. all the constituents put together) should not be less than 20,000 as per the 2001 Census. In varying local conditions, there were similar other combinations which have been treated as urban agglomerations satisfying the basic condition of contiguity. Examples: Greater Mumbai UA, Delhi UA, etc."

Planning for Development of Metropolitan Regions

Alongside Development Plans of cities, there is now increasing focus on planning of urban agglomerations in the form of Metropolitan Regions. The 74th Constitutional Amendment (1992) took note of these developments and has provided for a different forum namely, the Committee for Metropolitan Planning. It defines 'Metropolitan Areas' as those areas "having a population of ten lakhs or more comprised in one or more districts and consisting of two or more Municipalities or Panchayats or other continuous areas, specified by the Governor by public notification to be Metropolitan area for the purposes of this Part"

As a result of these developments various Metropolitan Development Authorities have been set up in India to have a balanced development of the whole of the Metropolitan Region which includes in it various cities, various districts and rural areas in the defined region. In India there are 53 urban agglomerations with a population of 1 million or more. About 43 percent of the urban population of India lives in these cities. Presently, Census of India considers a **metropolitan** city as one having a population of over one million and a **megacity** as one with a population of over four million.

The top urban agglomerations in the form of Metropolitan Region are as under:

Region	Core City	Core City Area (sqkm)	Population of Core City	Metropolitan Area (sqkm)	Population of UA of Metropolitan Area	Share of Core City to Metropolitan Area	Population Share Core City to Metro Area
MMR	Mumbai	438	1,24,42,373	4,254	2,28,04,355	10.3	54.56
NCR	Delhi+ New Delhi	1483	1,10,07,835	34,144	1,63,14,838	4.3	67.47
CMA	Chennai	426	46,81,087	1,189	86,96,010	35.8	53.83
KMA	Kolkata	185	44,96,694	1,887	1,43,84,585	9.8	31.26
BMA	Bangalore	741	84,25,970	1,220	84,99,399	60.7	99.13
HMA	Hyderabad	650	68,09,970	7,100	77,49,334	9.2	87.87
AMA	Ahmadabad	464	55,70,585	7,700	63,52,254	6.0	87.69
SMR	Surat	327	44,62,002	4,255	45,85,367	7.7	97.30
PMR	Pune	224	31,15,431	9,220	50,49,968	2.4	61.69

Source: Draft Mumbai Metropolitan Regional Plan 2016-2036.

National Capital Region – Mega Regional Development

New Delhi, being the national capital has its own significance. New Delhi which took about 20 years to develop is a classic example of urban planning. As the whole gamut of activities arose over time, they were accommodated over the years on the principle of satellite towns in the suitable locations around the Delhi. Accordingly, a number of towns emerged having industries, service sector, businesses, etc. Thus, the region took the form of a mega urban agglomeration aptly named the **National Capital Region**. It is a central planning region centered upon the National Capital Territory. It covers the entire the entire National Capital Territory of Delhi and in all 22 districts surrounding it from the States of Haryana, Uttar Pradesh and Rajasthan.

The NCR and the associated National Capital Region Planning Board were created in 1985 to plan the development of the region and to evolve harmonized policies for the control of land-uses and development of infrastructure in the region. Prominent cities in the region include Delhi, Ghaziabad, Faridabad, Gurgaon and Noida. The NCR is a rural-urban region, with a population of over 46,069,000 and an urbanization level of 62.6%.

ROUND & ABOUT

More Awards and Recognition to Indian Urban Heritage

Three Mumbai heritage structures won UNESCO Asia-Pacific Award for Conservation on 14th October, 2019. They are **Flora Fountain and Keneseth Eliyahoo Synagogue at Fort, and Our Lady of Glory Church at Byculla. The Vikram Sarabhai Library at the IIM, Ahmedabad** also won the award. According to a MCMG officer, "Out of the 16 awards given, four are bagged by India, and three of these by Mumbai's heritage structures. It credits our efforts in urban heritage conservation, and also gives other Asia-Pacific countries a benchmark on how heritage conservation should be done."

(Source: Hindustan Times, Mumbai, 15 October, 2019)

Mumbai and Hyderabad included in the UNESCO's network of Creative Cities

Urbanization, among other things, gives rise to flowering of creativity, arts, culture, music, folk arts and performing arts, and host of other things. The UNESCO's Network of Creative Cities brings together cities that base development on creativity in music, arts and folk crafts, design, cinema, literature, digital arts or gastronomy. Cities are included in the network on the basis of their distinct standing in these fields. On 31 October (World Cities Day) this network was expanded to 246 members, which included Mumbai for its blooming film industry (Bollywood) and Hyderabad for its haleem (a preparation of pounded wheat, meat and ghee) and Biryani(a special rice item). Earlier Varansi and Chennai were included in the network for music and Jaipur for crafts and folk art.

(Source: Times of India, Mumbai, 1 November, 2019)

Mantra for Topping the Swachh Survekshan Decoded

Topping the nationwide Swachha Survekshan is a big achievement- like national championship. Peddapalli district of Telangana was declared the cleanest district in the Swachh Survekshan 2019. Swachha Survekshan provided a level playing field to all. All the parameters were known, targets were declared, etc. It is a matter of curiosity as to how this district became the cleanest in the country. The analysis showed that they did nothing out of the box. They just implemented the Mission in most earnestness and achieved the following:

1) Over 16,000 community soak pits constructed. 2) More than 75,000 household soak pits constructed. 3) The district became open-drainage-free, no sewerage on the roads. 4) Houses in all the 263 villages have individual toilets. 5) More than 75,000 household soak pits constructed. 6) The district is now open drainage free. 7) Houses in all the 263 villages have individual houses. Community toilets (separate for men and women) built in 262 villages; village sanitation committees responsible for maintaining them. 8) The committees are responsible for keeping the storm water drains free of garbage. etc.

(Source: Indian Express, Mumbai, 14 October, 2019)

World Toilet Day

The World Toilet Day was celebrated on 19 November, 2019. The United Nations General Assembly had officially designated 19 November as World Toilet Day. The Day is about taking action to ensure that everyone has a safe toilet by 2030 in terms of the Sustainable Development Goal 6. This year the Day is drawing attention to those people being left behind without sanitation and the social, economic and environmental consequences of inaction. The Day inter alia, aims to remove any stigma around the sanitation work as it says that "a toilet is not just a toilet. It's a life-saver, dignity-protector and opportunity maker"

(Source: Media Reports)

World Cities Day

Urbanization is one of the world's most transformative trends. It poses several sustainability challenges related to housing, environment, climate change, infrastructure, basic services, food security, health, education, decent jobs, safety and natural resources. The United Nations its resolution of 27 December, 2013 designated 31 October as World Cities Day in order to promote the international community's interest in global urbanization, enhance cooperation among countries and cities in meeting opportunities and addressing challenges of urbanization. This year the theme is: Better City, Better Life.

(Source: UN- World Cities site)

Sea Level Rise on Indian Coast

Threats arising out of impact of climate change are often stated in reports inter alia pointing the threats of inundation of coastal cities. The Ministry of Earth Sciences has been working on India-specific report on impact of climate change, collecting all measurable data from different scientific institutions. Based on this data and in response to a Parliament Question, Rajya Sabha was informed by the Minister of State for Environment that sea-levels along the Indian coast have risen by 8.5 cm during the past 50 years with an average of 1.7 mm per year. The Minister also stated that "the rising sea levels can exacerbate coastal inundation along low lying areas during the extreme events such as tsunami, storm surge, coastal flooding and coastal erosion."

(Source: Times of India, Mumbai, 20 November, 2019).

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