R4D PROJECT:
CHALLENGES OF MUNICIPAL WASTE MANAGEMENT: LEARNING FROM POST-CRISIS INITIATIVES IN SOUTH ASIA

PROJECT WORKING PAPER #4

INSITUTIONAL STRUCTURE OF GOVERNANCE OF MUNICIPAL SOLID WASTE MANAGEMENT IN INDIA

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ABSTRACT

Rapid urbanization, economic growth and growing consumerism have resulted in increased solid waste generation across the globe and especially in South Asia. In this paper we try to address the issues surrounding the governance of municipal solid waste management by mapping the governance institutions associated with MSWM and studying their interactions in order to better understand the governance of MSWM in India. This study primarily maps the institutional structure of governance of MSWM, unpacks the mandates of the ministries involved and identifies the conflicts among the stakeholders involved in MSWM at the national (central government) level, state (Kerala) and local (Thiruvananthapuram city corporation) level. The study was done by conducting literature review of academic papers and official government websites and documents. Semi-structured interviews of government officials, practitioners and local representatives of Thiruvananthapuram Corporation were also conducted. At the central level, it could be observed that conflicts stem from the differing approaches of various ministries towards the problem of MSWM and discrepancies in data pertaining to waste. At the state level, we could identify overlaps between the two of the government's missions pertaining to MSWM. A clash between the central government and state government with regard to handling of MSWM at an urban local body has also been discussed in the paper. It could be observed that the reason for the clash is the insistence that the state has to follow central government norms, despite it being less suitable to local needs.

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CHAPTER 1

LIST OF ABBREVIATIONS

CAA	Constitutional Amendment Act
CPC	Central Pollution Control Board
CPHEEO	Central Public Health and Environmental Engineering Organisation
HKM	Haritha Kerala Mission
KSPCB	Kerala State Pollution Control Board
MoEFCC	Ministry of Environment Forests and Climate Change
MNRE	Ministry of New and Renewable Energy
MoHUA	Ministry of Housing and Urban Affairs
MSWM	Municipal Solid Waste Management
NGO	Non-Governmental Organization
NGT	National Green Tribunal
NULM	National Urban Livelihood Mission
NUSP	National Urban Sanitation Policy
LSG	Local Self Governments
LSGIs	Local Self Governance Institutions
SBM	Swachh Bharat Mission
SPSWM	State Policy on Solid Waste Management
SWM	Solid Waste Management
ULBs	Urban Local Bodies
ULB	Urban Local Body
WtE	Waste to Energy

CHAPTER 1
1. Introduction

Rising population levels, with 18 percent of the world's population living in India, coupled with economic growth and higher living standards contributes to the rapid increase of municipal solid waste (MSW) in India (The World Bank, 2020) (Mufeed Sharholy, 2007). Estimates suggest that over half of India's total population will live in cities by 2050 (Centre for Science and Environment, 2018). A daunting task for policymakers in the field of municipal solid waste management (MSWM) is the challenge of predicting the composition of the MSWM that is likely to be generated in the times to come so that the most appropriate disposal strategy can be planned (Daskalopoulos, Badr, & Probert, 1998). With megacities spurting a growth of 30.47 percent per annum, the Indian administration has given more focus to services like water, electricity and food for the rapidly growing population, but has neglected to improve another crucial aspect of a city's health: waste management (Swaminathan, 2018).

Existing studies on MSWM in India mostly deal with status of MSWM infrastructure and the implementation challenges (Mufeed Sharholy, 2007), (Joshi & Ahmed, 2016) , (Aich & Ghosh, 2019), (Swaminathan, 2018) or MSWM government policies (Mani & Singh, 2016) (Wankhade, 2015). This report attempts to study the governance institutions involved in municipal solid waste management in India and their interactions. Governance is about the rules of collective decision-making in settings involving plurality of actors/ organisations where formal control system are unable to dictate the terms of the players (Chhotray & Stoker, 2009). Governance systems are seen as driven by networks rather than hierarchies. It has been recognised that the relationships in increasingly complex systems of governing are not necessarily hierarcical in nature. Neither are these relationships determined by the authority and capacity of the state actors. In order to achieve an outcome through governance, merely passing a law or an edict from a formal authority will not be sufficient. The engagement of a range of actors, especially the negotiation in networks becomes the key governance activity (Chhotray & Stoker, 2009). Hence it is important to map the various stakeholders in the MSWM process and study their interactions in order to understand the governance sturcture of MSWM in India. Governance structure should be able to answer questions like "How should power be distributed? Who should be involved in a decision? and How should rules, once agreed, be enforced?" (Chhotray &

Stoker, 2009, p.228). Governance structure is different from institutional architecture, which in addition to governance institutions also covers policies and laws.

This paper has three objectives: (a) to trace the governance institutions involved in MSWM in India, at the central level, the state (Kerala) level and local level (urban local body) ; (b) to map the roles and responsibilities of institutions involved in MSWM; (c) to identify gaps, overlaps and conflicts between the institutions.

Chapter 1 of the report discusses why the problem of MSWM in India demands attention and also discusses the relevance of studying the governance institutions associated with of MSWM. Chapter 2 gives an overall picture of institutional structure of governance in MSWM in India and elaborates on the institutional structure of governance of MSWM at the centre government level. The conflicts between the various ministries in their approach towards MSWM and discrepancies in the data on the quantum of waste generated have also been discussed. In chapter 3, the state-level (Kerala) agencies involved in MSWM, role of urban local bodies with regard to MSWM and SWM-related missions of the state are discussed. The overlaps between the missions of government and the clash between central and state government agencies have also been discussed in the chapter.

Methodology

The study is mostly based on a review of literature. Search results in Google Scholar using keywords "Municipal + solid + waste + management + India", "Municipal + solid + waste + governance + India", and "Municipal + solid + waste + chains + India" generated several articles pertaining to the subject. However, none of them discussed all the roles and responsibilities of the various stakeholders involved in MSWM and none of them discussed the overlaps and conflicts between institutions involved in MSWM. The institutional structure of governance of MSWM was first mapped from the official websites and documents of these institutions. This was complemented with key stakeholder interviews with officials, academics and NGO practitioners by field interviews conducted in Thiruvananthapuram in 2019 December. Insights from these semi-structured interviews helped in identifying the conflicts between different stakeholders experienced on ground. Such nuances could not have been identified by analyzing the information available on official websites and documents of the involved governance institutions alone.

CHAPTER 2
2. Institutional structure of Governance of MSWM in India

The structure of the government in India is federal in nature. Governance takes place at three levels: central (union), state and local. Governance is a political activity and it requires coordination and decision-making taking into consideration the plurality of views and interests involved (Chhotray & Stoker, 2009). Engagement between several stakeholders is necessary to achieve an outcome and cannot just be delivered by passing a law from a formal authority. Modern governing faces a demanding set of power dependencies and the actors involved cannot command the response of each other, but rather have to rely on negotiated outcomes (Chhotray & Stoker, 2009). There are several institutions involved in the governance of MSWM in India. Several theorists have defined institutions from a rules perspective[1]. The power dependencies discussed here are particularly significant in the case of institutional structure of governance of MSWM in India, especially considering the complexity of the networks and the levels of institutions.

In 1992, the 73rd and 74th constitutional amendment acts (CAA) added the 11th and 12th schedules, respectively, with a list of 29 subjects and 18 subjects respectively, which could be devolved to the Local Self Governance Institutions (LSGIs) by the state. The division of powers, finance and functional autonomy of LSGIs were left to the discretion of the states (Mohankumar, 2002). The 74th CAA assigned the duties of planning, implementing and monitoring of urban service deliveries, especially of MSWM to urban local bodies (ULBs). With limited financial resources, technical capacities and land availability, urban local bodies are constantly trying to meet this challenge (CPHEEO, 2016).

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[1] Douglass North (1990) has defined institutions as "the rules of game in a society, or more formally, the humanly devised constraints that shape human interaction" and Ruttan and Hayami (1984) as "rules of a society or of organisations that facilitate coordination among people by helping them from expectations which each person can reasonably hold in dealing with others" (Chhotray & Stoker, 2009, p. 63-64)

Figure 1: Schematic representation of institutional architecture MSW in India
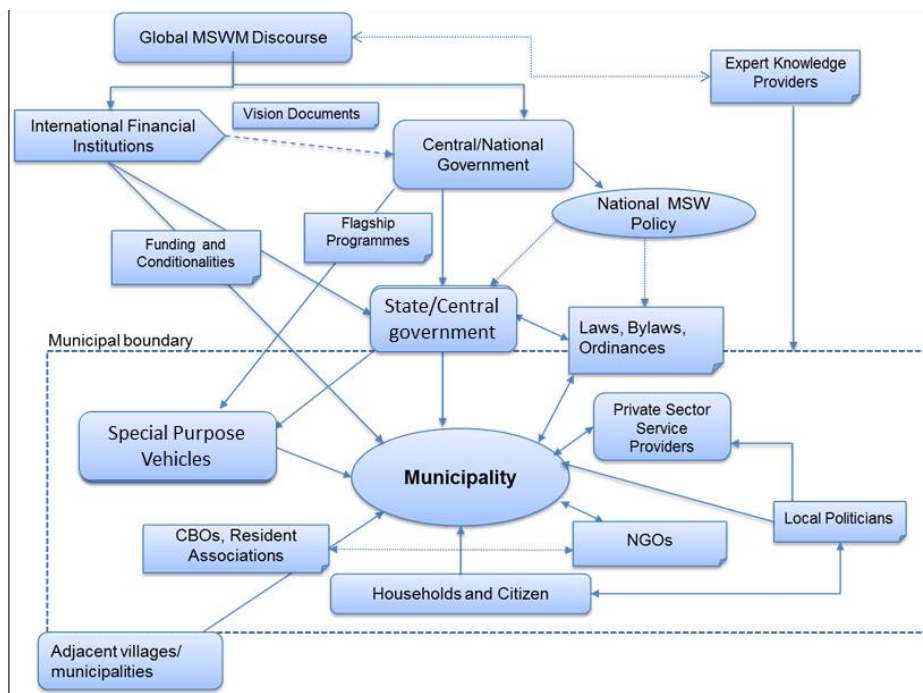
The central government broadly formulates policy guidelines and provides technical assistance to the states/cities, whenever needed. It also helps the state governments and local bodies in human resource development and acts as an intermediary in mobilizing external assistance for implementation of solid waste management projects (CPHEEO, 2013). The central government provides most of the capital investments in the field of urban sanitation through various programmes and it is important to adhere to the technical specifications decided by the central government, thereby strengthening centralized control (Wankhade, 2015). The subject of solid waste management for urban areas and rural areas in India has completely different agencies involved. In this paper, we solely focus on institutional structure of governance of solid waste management in urban areas or municipal solid waste management.

2.1 Institutional structure of Governance of MSWM at the Centre Government level

The increasing population has made MSWM in India a challenge both because of wellbeing, environmental and aesthetic concerns and also because of the huge quantities of municipal solid waste (MSW) generated every day (Mani & Singh, 2016) (CPHEEO, 2016). There are three ministries of the Government of India that initiate policies and

programs to improve the MSWM scenario in the country. They are Ministry of Environment, Forest and Climate Change (MoEFCC), Ministry of Housing and Urban Affairs (MoHUA) (Mani & Singh, 2016) and the Ministry of New and Renewable Energy (MNRE).

Figure 2: Institutional structure of governance of MSWM at the Central Government
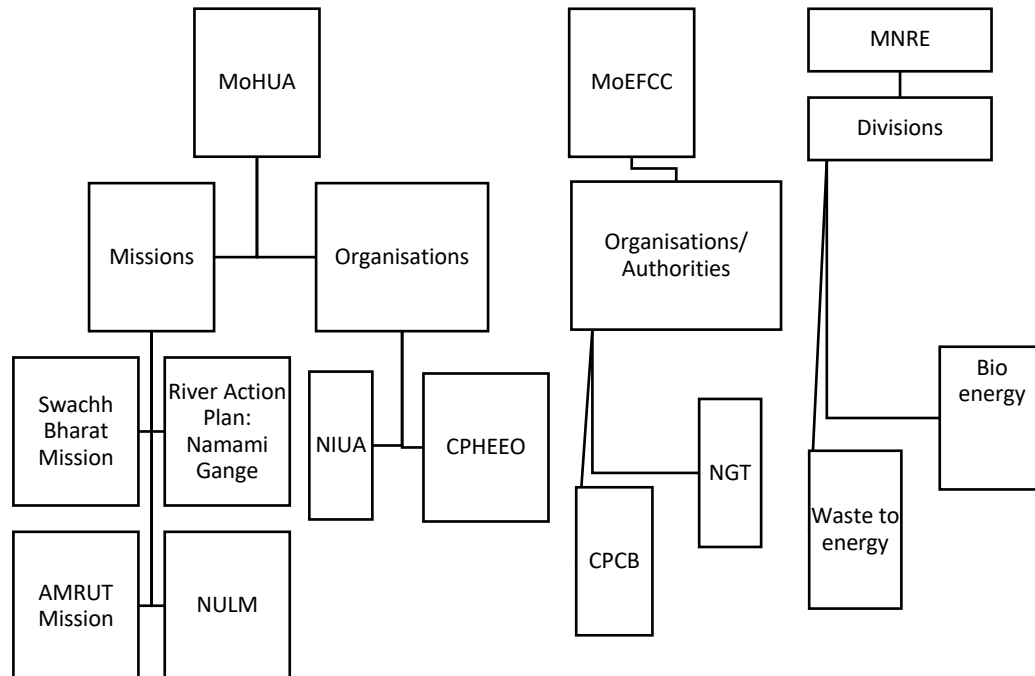
In this paper, the roles and responsibilities of the various ministries and institutions were collated by examining official website of the individual ministries and by deciphering the official documents published by the ministries and/or their subsidiaries. Like other public organisations, ministries too are driven by rules and budgets (Osborne, 1993). When a ministry endows a 'mission' status to address a particular issue, it signals the political priority to officials involved (Abrol & Bedenik, 2019) and a desire or need to bypass existing institutions, departments etc. Details of the roles and responsibilities of individual ministries, their institutions, missions and other policy instruments have been described below.

2.1.1 Ministry of Housing and Urban Affairs

The Ministry of Housing and Urban Affairs (MoHUA) is an apex authority of Government of India. It is one of the key ministries dealing with the issue of MSWM in India. It formulates policies, sponsors, supports and monitors programmes concerning housing and urban

affairs. It also coordinates activities of various central ministries, state governments and other nodal authorities. Sewage, drainage and sanitation of urban areas and linkages from allocated water resources, international cooperation and technical assistance in this field are allocated duties of MoHUA.

There are two institutions under MoHUA that are involved with MSWM sector – Central Public Health and Environmental Engineering Organization (CPHEEO) and National Institute of Urban Affairs (NIUA). The ministry also has 'missions' that focuses on MSWM sector- Swachh Bharat Mission (urban) (SBM) and National Urban Livelihood mission. National Urban Sanitation Policy 2008 and Municipal Solid Waste Management Manual 2016 are policy instruments prepared by the ministry.

2.1.1.1 Organisations associated with MoHUA
CPHEEO

The Central Public Health and Environmental Engineering Organization (CPHEEO) is the technical wing of MoHUA. Its duties include the technical scrutiny of solid waste management schemes for urban sector submitted by the state governments, local government authorities and union territories. CPHEEO acts as an advisor to concerned state agencies and ULBs in implementation, operation & maintenance of urban water supply, sanitation and solid waste management projects. It also acts as a nodal agency providing technical assistance to MoEFCC, MNRE, and several other ministries, with respect to projects referred by them.

National Institute of Urban Affairs (Autonomous)

NIUA is an autonomous body established in 1976 as an apex body to support and guide the Government of India in its urban development plans. It works closely with MoHUA and is engaged in research, capacity building and dissemination of knowledge for urban India. In addition to conducting studies of SWM, it has conducted workshops to create awareness among ULB officials about the objectives of SBM along with enabling policies, rules and guidelines. It builds capacities of ULBs by improving their understanding of SWM and improving their skills to deal with it. NIUA also engages with MoEFCC (NIUA, 2020).

Table 1: Overall duties and SWM related duties of MoHUA and related institutions

Institutions	Overall duties	SWM related duties
MoHUA	define policies, fund and support, monitor programmes relating to housing and urban affairs (including water supply and sanitation)	Formulation of National Urban Sanitation Policy
	coordinate the activities of various Central Ministries, State Governments and other nodal authorities	
CPHEEO	technical wing of the MoHUA dealing with urban water supply and sanitation	Preparation of MSWM Manual (planning, technical, institutional, financial, legal aspects)
	support MoHUA in policy formulation, handholds States through technical advice, guidelines, scrutiny and appraisal of schemes and propagation of new technologies	Preparation of MSWM Manual (planning, technical, institutional, financial, legal aspects)
	"Advisory body at Central level to advise the concerned State agencies and Urban Local Bodies (ULBs) in implementation, operation & maintenance of urban water supply, sanitation and solid waste management projects and helps to adopt latest technologies in these sub sectors"[2]	
NIUA	to support and guide the Government of India in its urban development plans	conduct workshops to create awareness among ULB officials about the objectives of SBM along with enabling policies, rules and guidelines[3]

Sources: (MoHUA, 2017), (NIUA, 2020) (CPHEEO, 2019)

[2] CPHEEO. (2019, November 5). CPHEEO.gov.in. Retrieved June 2, 2020, from CPHEEO.gov.in

[3] NIUA. (2020). NIUA.org. Retrieved June 5, 2020, from NIUA.org: www.niua.org

2.1.1.2 SWM related missions of MoHUA
Mission: Swachh Bharat Mission (Urban)

The Swachh Bharat Mission was launched in 2014 to make urban India free from open defecation and attaining scientific management of municipal solid waste in 4041 statutory towns in the country (MoHUA, Ministry of Housing and Urban Affairs, 2017). It is also a tool to achieve the goals of National Urban Sanitation Policy (NUSP) 2008 (Kerala State Sanitation Strategy, 2017). Its objectives include elimination of open defecation, eradication of manual scavenging, modern and scientific municipal solid waste management, to inculcate behavioral change regarding healthy sanitation practices, generate awareness about sanitation and its linkage with public health, to create an enabling environment for public sector participation in the capital expenditure and operation and maintenance (MoHUA, Ministry of Housing and Urban Affairs, 2017).

Mission: National Urban Livelihood Mission (NULM)

The National Urban Livelihood Mission (NULM) aims to reduce poverty and vulnerability of the urban poor households by enabling them to access gainful self-employment and skilled wage employment opportunities. This would result in an appreciable improvement in their livelihoods on a sustainable basis, through building strong grassroots level institutions of the poor. (Suchitwa Mission, 2015). The MoHUA has prepared guidelines to converge NULM with SBM, thereby generating employment opportunities in the field of MSWM (DAY-NULM, MoHUA, & SBM, 2018).

Table 2: Aim and SWM related duties of MoHUA's missions

Mission	Overall goals	SWM related goals
SBM	provide basic infrastructural and service delivery with respect to sanitation facilities	adopt scientific methods to collect, process and disposal of municipal solid waste4
NULM	"reduce poverty and vulnerability of the urban poor households" through enabling self-	"reduce poverty and vulnerability of the urban poor households" through enabling self-employment

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[4] MoHUA. (2017, october 5). Ministry of Housing and Urban Affairs. Guidelines for Swachh Bharat Mission - Urban. New Delhi, New Delhi, India: Government of India.

	employment and skilled wage employment opportunities5	and skilled wage employment opportunities6

<div align="right">Source: (MoHUA, 2017) (MoHUA, 2020)</div>

2.1.2 Ministry of Environment Forests and Climate Change (MoEFCC)

The MoEFCC is a nodal agency of the central government whose responsibilities include planning, promotion, coordination and overseeing the implementation of India's environmental and forestry policies and programs. The environment division of the MoEFCC deals with issues relating to solid waste. The Central Pollution Control Board (CPCB) and National Green Tribunal are institutions associated with the ministry that helps it to conduct its MSWM related duties. The Solid Waste Management Rules 2016 prepared by MoEFCC and National Action Plan for Solid Waste Management prepared by CPCB are policy instruments the ministry has employed to realize its SWM related duties.

2.1.2.1 Organisations associated to MoEFCC
Central Pollution Control Board

The Central Pollution Control Board (CPCB) is a statutory organisation that was constituted under the Water (Prevention and Control of Pollution) Act, 1974. The CPCB was entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981. It also provides technical services to the Ministry of Environment and Forests of the provisions of the Environment (Protection) Act, 1986. The principal functions of the CPCB, includes a) promoting cleanliness of streams and wells in different areas of the States by prevention, control and abatement of water pollution, and b) to improve the quality of air and to prevent, control or abate air pollution in the country.

National green tribunal (NGT)

Established under the National Green Tribunal Act of 2010, the duty of NGT is to effectively and quickly solve cases relating to environment protection and conservation of forests and other natural resources. It is a specialised body that handles environmental disputes involving multi-disciplinary issues. The appointments to the NGT are made by MoEFCC subject to consultation of the Supreme Court. NGT's judiciary functions are controlled by the Supreme Court.

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[5] MoHUA. (2020). smartnet.niua.org. Retrieved June 2, 2020, from Smartnet: https://smartnet.niua.org/nulm

[6] MoHUA. (2020). smartnet.niua.org. Retrieved June 2, 2020, from Smartnet: https://smartnet.niua.org/nulm

Table 3: Overall duties and SWM related duties of MoEFCC institutions

Institutions	Duties	SWM related duties
MoEFCC	planning, promotion, co-ordination and overseeing the implementation of environmental and forestry policies and programmes[7]	Formulation of Municipal Solid Waste Management Rules 2016
	nodal agency for United Nations Environment Programme (UNEP), United Nations Conference on Environment and Development (UNCED)[8]	Provide financial support of up to 50% of the capital cost to set up pilot demonstration plants of MSW composting[9]
		Financial assistance for waste characterization and feasibility studies
CPCB	Advisory to Central Government on matters relating to prevention and control of water and air pollution[10]	Preparation of Consolidated Annual Report on implementation of SWM Rules 2016 and National Action Plan for MSWM 2016
	Implementation of legislations relating to prevention and control of environmental pollution.	
NGT	effectively and quickly solve cases pertaining to environment protection and conservation of forests and other natural resources	

source: (MoEFCC, 2020) (CPCB, 2020)

2.1.3 Ministry of New and Renewable Energy

The MNRE focuses on developing and implementing new and renewable energy technologies and it views the problem of MSWM sector through the same lens. The two

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7 MoEFCC. (2020). Parivesh. Retrieved June 2, 2020, from Parivesh: https://parivesh.nic.in/
8 MoEFCC. (2020). Parivesh. Retrieved June 2, 2020, from Parivesh: https://parivesh.nic.in/
9 MoHUA. (2020). smartnet.niua.org. Retrieved June 2, 2020, from Smartnet: https://smartnet.niua.org/nulm
10 CPCB. (2020, July 7). ENVIS Centre on Control of Pollution Water, Air and Noise . Retrieved september 26, 2020, from http://cpcbenvis.nic.in/water_pollution_main.html

divisions of MNRE whose policies and schemes have implications on the MSWM are its Waste to energy division and Bio Energy Division (Vaish, Srivastava, Singh, & Singh, 2016). Details of the MNRE and its divisions are discussed below.

The Ministry of New and Renewable Energy is a nodal ministry of the central government which develops and implements new and renewable energy, like its name suggests, supplementing India's energy needs. Two of the divisions of the ministry- Waste to Energy and Bio Energy – require municipal solid waste as input. The ministry's schemes/policies have implications on the MSWM governance in the country (Vaish, Srivastava, Singh, & Singh, 2016).

In its Annual Report (2018-2019) the MNRE mentions MSW as one of the inputs when talking about its Programme on Energy from Urban, Industrial and Agricultural Waste/Residues aimed at generation of biogas, BioCNG and Power from different wastes. But in the MNRE Annual Report of 2019-2020, MSW as an input is not mentioned directly.

2.1.3.1. Divisions within MNRE
Waste to Energy division

One of the objectives of the WTE division of the ministry is "to promote setting up of projects for recovery of energy in the form of Biogas / BioCNG/Enriched Biogas/ Power from urban, industrial and agricultural wastes and captive power and thermal use through gasification in industries". Here, the term "urban waste" is not defined but it is understood to be MSW. Another objective is "to create conducive conditions and environment, with fiscal and financial regime, to develop, demonstrate and disseminate information on recovery of energy from waste and residues." WTE plants require huge amounts of waste to process. Hence a centralised waste management system is being promoted.

Bio Energy division

The bioenergy division promotes technologies which make use of biomass resources for grid power generation. The bio energy division has two schemes: for biomass energy and biogas. The Biomass energy -energy generated organisms (living or dead) - scheme focuses on promotion of biomass related cogeneration in sugar mills and other industries (MSW is not covered under this scheme). The biogas- flammable mixture of gases produced by the decomposition of organic matter in the absence of oxygen- energy scheme promotes biogas-based decentralised renewable sources of power generation.

2.2 Conflict between approach towards MSW: MoEFCC, MoHUA and MNRE

In this section the various conflicts that arise due to the difference in approach of the MoEFCC, MoHUA and MNRE are discussed after analyzing the mandates, roles and responsibilities of the ministries.

2.2.1 Mandate of the Ministries Involved

The three ministries who have a stake in the municipal solid waste management in the country are Ministry of Environment Forests and Climate Change, Ministry of Housing and Urban Affairs and Ministry of New and Renewable Energy. The ministries have very different mandates.

Table 4: Ministries and Mandates

Ministry	Mandate
MoHUA	To make policies, fund and support, monitor programmes relating to housing and urban affairs (including water supply and sanitation).
MoEFCC	To plan, promote, co-ordinate and oversee the implementation of environmental and forestry policies and programmes for conservation of the country's natural resources including its lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of animals, and the prevention and abatement of pollution[11]
MNRE	To "develop and deploy new and renewable energy to supplement the energy requirements" of India[12]

source: (MNRE, 2020) (MoEFCC, 2020)

Each of these ministries looks at the problem of MSWM in a different way. While for the MoHUA it is a problem of maintaining the urban metabolism, for MoEFCC, the prime objective is to prevent the pollution that may be caused due to MSW. The MNRE is interested in the utility that can be derived from the waste in the form of a renewable energy resource.

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[11] MoEFCC. (2020). Parivesh. Retrieved June 2, 2020, from Parivesh:
https://parivesh.nic.in/About.aspx#:~:text=The%20Ministry%20of%20Environment%2C%20Forest,and%20forestry%20p
olicies%20and%20programmes
[12] MNRE. (2020, June 2). MNRE.gov.in. Retrieved June 2, 2020, from MNRE.gov.in: https://mnre.gov.in/the-ministry/what-does-the-ministry-do/

All the three ministries are making policy instruments upholding their mandates, referring to each other, and at times conflicting with each other. All three agencies are nodal agencies with implementation of global policies also in their interest. The question of who is the ultimate authority when it comes to MSWM policy making in the country is unclear.

2.2.2 Discrepancy over quantum of waste generated, collected and processed

In 2014, the report of the task force on WTE mentions that the estimated amount of *municipal sold waste* generated annually in India is 62 million tonnes, excluding waste picked up by informal sector (Planning Commission, 2014). In 2016, MoEFCC note that 62 million tonnes of waste is generated in India annually. Here is the first discrepancy: whether the 62 million tonnes of waste is municipal solid waste alone or waste from both urban and rural areas. The report of the task force on WTE also mentions that according to Ministry of Urban Development (now MOHUA) 70 million tonnes of waste is generated in urban areas and that there is confusion with regard to waste generation since there is no system of periodically collecting and updating waste quantity and composition. According to Swachh Bharat Mission's Municipal Solid Waste Management Manual, 1.43 lakh tonnes of MSW is generated per day, i.e., 52 million tonnes of MSW annually (CPHEEO, 2016).

As per the MoEFCC, of the 62 million tonnes of waste generated, only 70 percent is collected and only 28 percent of the collected waste is treated (MoEFCC G. o., 2016). According to the National Action Plan for Solid Waste Management, 90 percent of the waste generated is collected and 27 percent of it is processed (CPCB, The National Action Plan For Solid Waste Management, 2016). According to the Municipal Solid Waste Management Manual, of the total MSW generated, about 80 percent was collected and only 22 percent of it is treated/processed (CPHEEO, 2016). Hence, at a national level, there is no consensus to what the actual figures are with respect to waste generation, waste collection and waste treatment.

2.3 Conclusion

There are mainly two inconsistencies that could be identified with regard to the governance of municipal solid waste management at the central government level. The first one is the issue of 'mandate determining solutions'. When different government agencies with starkly different mandates address the same problem of governance of municipal solid waste

management, the solutions that are arrived at, when analysed together, create a cognitive dissonance. The mandate plays a dominant role in determining the agency's approach towards municipal solid waste.

The second one is the issue of discrepancy in waste quantification. The National Action Plan for Solid Waste Management says that there is no systematic and authentic data on MSW generation available at national level in India (CPCB, The National Action Plan For Solid Waste Management, 2016).This is a problem that is particular concerning as quantity and nature of waste of the ULBs are important factors in determining the approach that should be opted towards solid waste management.

CHAPTER 3

**3.	Institutional structure of Governance of MSWM- state and local level**

The institutional structure of governance of municipal solid waste management at the state level and the municipality's roles and responsibilities will be discussed in this chapter. The Kerala State Pollution Control Board (KSPCB) and Local Self Governance Department are the two institutions dealing with the issue of MSWM.

Figure 3: Institutional structure of governance of MSWM in Kerala
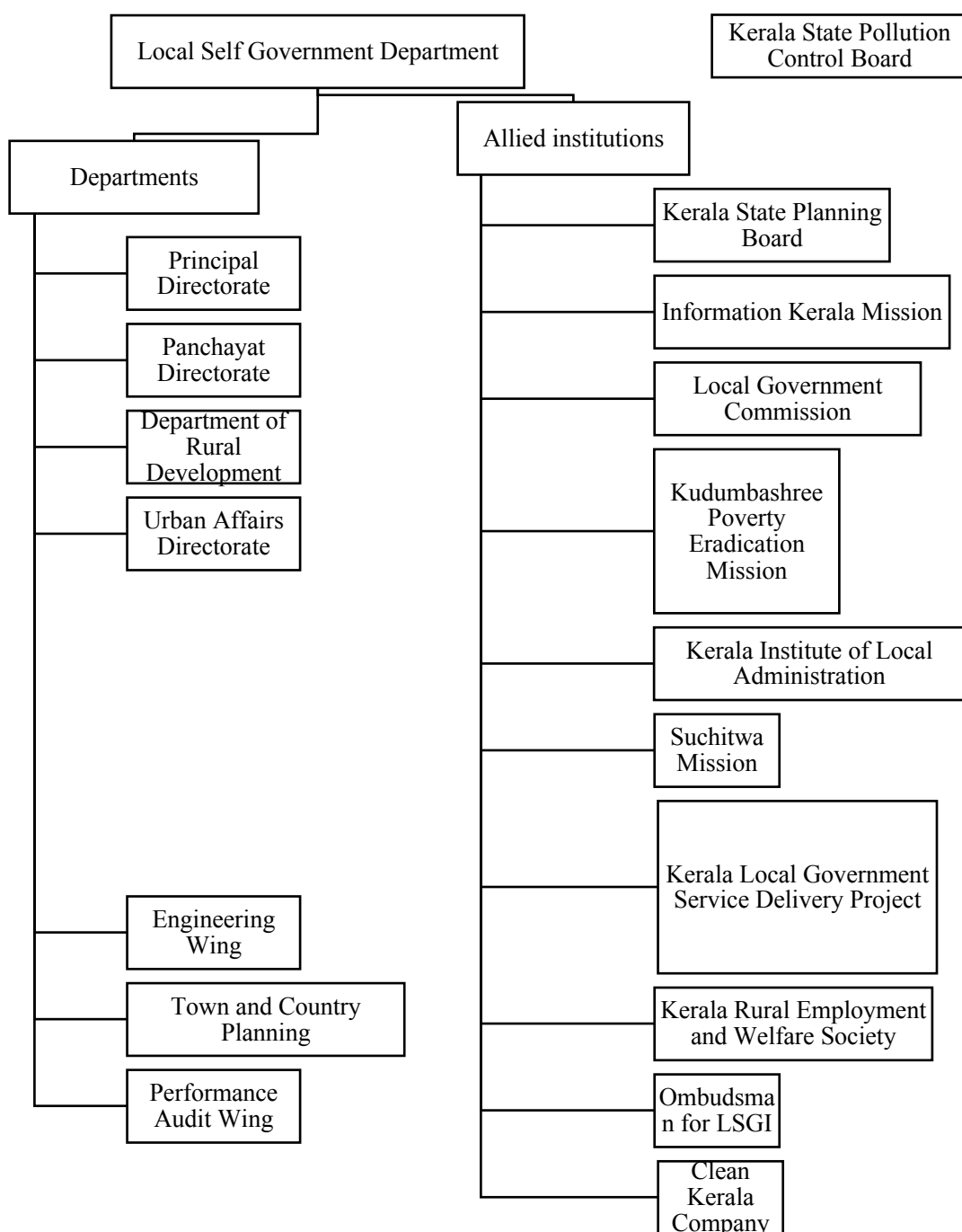
3.1 Kerala State Pollution Control Board (KSPCB)

The state pollution control board acts as a subsidiary of the central pollution control board. Its functions pertaining to solid waste management include monitoring of the compliance standards on ground water, air, leachate quality, compost quality and incineration, authorization of waste processing or disposal facilities and furnishing annual reports to submit to the Central Pollution Control Board. The KSPCB also enforces all provisions of central government's SWM Rules 2016 through LSGs in their respective jurisdiction and reviews implementation at least twice a year, working in close coordination with Suchitwa Mission. It monitors environmental standards of activities pertaining to waste management and also regulates the inter-state transport of waste.

3.2 Local Self Governance Department (LSGD)

The LSGD is responsible for overseeing of various service delivery and regulatory agencies associated with decentralized governance and monitoring the performance of local governments in respect of their regulatory and service delivery functions. It also ensures the standardization of planning processes, technical norms, and financial integrity through guidelines issued from time to time (Local Self Government Department, 2020)

Table 5: LSGD departments and their functions

Ministry	Mandate
Panchayat Directorate	Monitor the progress of utilization of various funds of the village panchayats and their own income
	Ensure the registration of all births and marriages in the state.
	Accept the bylaws of the village panchayats.
	Determination of membership of tri-level panchayats.
	Distribution of various social security pensions
Directorate of Urban Affairs (DoUA)	parent institution of Haritha Keralam Mission
	inspecting authority of all urban local bodies
Town and Country Planning Department	ensure planned development of urban settlements
	prepare various spatial development plans at State, District / Regional and local level

	advice the Government in matters related to town and country planning
Department of Rural Development	utilize resources available in villages to improve quality of life
Local Self Government Engineering	engineering wing of LSGD
Clean Kerala Company	management of all harmful wastes in the state including e-waste
Principal directorate	prepare the ground for the unification of above services
	finalize the draft laws submitted by the Local Government Commission and present it to the government

source: (Local Self Government Department, 2020)

3.2.1 Urban Local Bodies (ULBs)

Urban local bodies in India include municipal corporations for cities, municipalities for larger towns and town panchayats for smaller towns. The 74th Constitutional Amendment Act of 1992 provided the framework, composition and powers for ULBs, which has been established since April 1993. MSWM is one of the main tasks allocated to the ULBs. Preparation of MSWM plan as per the state policy and strategy on MSWM within six months from the date of notification of policy, arranging for door to door collection of segregated solid waste from all households, establishing a system to recognise and organise waste pickers or informal waste collectors and encouraging their participation in the formal waste collection process. Facilitation of the formation of self-help groups, framing bye-laws incorporating the provisions of SWM rules, prescribing of user fees from waste generator, directing waste generators to follow SWM rules, setting up of material recovery facilities or secondary storage facilities for recyclable wastes, establishing waste deposition centres for domestic hazardous wastes, ensuring safe transport and storage of domestic hazardous waste to disposal facilities, facilitate the construction, operation and maintenance of MSW processing facilities and associated infrastructure either on their own or with private sector participation, adhering to guidelines issued by MoHUA and CPCB, are few of the responsibilities of ULBs with regard to MSWM. The SWM Rules 2016 urges the ULBs to opt for decentralised processing with minimal transportation costs and environment impacts.

3.2.2 SWM-related missions of under LSGD

There are three missions under the Local Self Government Department in addition to the missions from the centre which have a complete/partial thrust towards MSWM. They are Kudumbashree Mission, Suchitwa Mission and Haritha Kerala Mission.

Kudumbashree Mission

Kudumbashree is the poverty eradication and women empowerment programme implemented by the State Poverty Eradication Mission (SPEM) of the Government of Kerala (Kudumbashree , 2020). Kudumbashree was set up in 1997. Its formation was in the context of the devolution of powers to the Panchayat Raj Institutions (PRIs) in Kerala, and the Peoples' Plan Campaign, which attempted to draw up the Ninth Plan of the local governments from below through the PRIs. The role of Kudumbashree in SWM of the state mainly comes through provision of (wo-)manpower to the Haritha Karma Sena (green volunteers) project.

Suchitwa Mission

The Suchitwa Mission provides technical and managerial support for waste management activities to the LSGs. The mission started in 2008 and is responsible for conceptualising, preparing action plans, conducting workshops, and training programmes, initiating sanitation sector related studies, bringing out occasional papers, initiating action research, conducting monitoring and other related activities in waste management sector (Suchitwa Mission, 2017)

The Suchitwa mission is the nodal agency for implementing Swachh Bharat Mission (urban), Swachh Bharat mission (rural) and Communication and Capacity Development Unit (CCDU) in Kerala. It functions as the technical support agency for Haritha Keralam Mission (Suchitwa Mission, 2017). It also mobilizes funds to LSGs to develop solid waste management facilities through central and state sponsored schemes.

Haritha Keralam Mission (HKM)

The Haritha Keralam (literal translation is *green Kerala*) mission is one of the four people's missions that started in 2016 as part of the government's 'New Kerala' campaign. (V.K.Ramachandran, 2018). It is a "public-centric" mission of the DoUA that is designed to be implemented under the stewardship of the LSGs encompassing voluntary organizations, NGOs, social

activists, environmentalists, students, youths and other discerning individuals and groups, according to the HKM official website (Haritha Keralam, 2016). It is an 'umbrella mission' and focuses on three areas: proper waste management, soil and water conservation, and promotion of organic farming. It ensures that waste management rules are adhered to and scientific waste management is practiced with 'active participation' of locals and LGSIs.

The HKM will coordinate the activities and performances of agencies involved in waste management with LSGI entities and also complexities and practical difficulties of hygienic waste management will be examined and interpreted in order to find solutions (Haritha Keralam, 2016).

Its solid waste management related objectives are:

- To create awareness on waste disposal as duty of citizens
- To aid the local self-governing bodies in finding out solutions for the complexities and problems involved in waste management
- Make permanent and scientific solutions for waste management in the local bodies

The Haritha Keralam Mission official website states that in addition to waste disposal at source, centralized modern waste management systems will also be adopted in the urban cities of Trivandrum, Kochi and Kozhikode. (Haritha Keralam, 2016).

Haritha Karma Sena (HKS)

Haritha Karma Sena is a team of professional technicians and supervisors (consisting mainly Kudumbashree women) who will be assigned with the responsibility of collection, transportation, processing, recycling / disposal, and management of waste materials in association with LSGs. HKS mainly focuses on non-biodegradable waste. The HKS selection is done by LSGI and Haritha Kerala Mission. The selection is done such a way that each member gets at least 250 households for non-bio degradable waste collection. Each HKS member gets a 3-days training on waste collection, segregation and other management activities. Kerala Institute of Local Administration (KILA) is funds the initial level training of HKS (Ratheesh, 2018).

3.3   Analysis of overlaps and conflicts at the state/local level

3.3.1 Overlaps between Suchitwa Mission and Haritha Kerala Mission (HKM)

The table below compares the functions of Suchitwa Mission and Haritha Kerala Mission.

Table 6: Comparison of functions of Suchitwa Mission and Haritha Kerala Mission

Suchitwa Mission	Haritha Kerala Mission
planning, organising workshops and training programmes, initiating sanitation sector related studies, conducting research, monitoring and other related activities in waste management sector	ensuring that waste management rules are adhered to and scientific waste management is practiced with 'active participation' of locals and LGSIs
monitor and coordinate SWM activities in the state; assist different tiers of government to adopt strategies of the state policy on SWM	coordinate the activities and performances of agencies involved in waste management with LSGI entities

source: (Local Self Government Department, 2020)

It is clear that there are overlaps between the two. HKM tries to ensure and encourage public participation in solid waste management, which seems to be the only task that is exclusive to HKM. The need for the hygienic waste management wing of the HKM when a mission like Suchitwa Mission exists is not clear.

3.3.2 Clashes between National Green Tribunal and Kerala State

The National Green Tribunal had criticized several local bodies in Kerala, including Thiruvananthapuram Corporation, for not having door-to-door waste collection system and a centralised waste management plant in the city. The NGT has also pointed out pollution of water bodies due to waste accumulation and had given time until October 2019 to come up with an action plan to rectify the problems (The Hindu, 2019).

The failure of the centralised waste processing plant located at Vilappilsala in 2012 led the corporation to look at waste management through a different lens. It was decided that maximum waste would be treated at source and only overflow waste would be treated at

community level treatment plants. This is in contrast to the SWM Rules 2016 which according to which a local authority should facilitate the construction, operation and maintenance of solid waste processing facilities. The same strategy as that of SWM Rules 2016 is adopted by Kerala's Solid Waste Management Policy (Local Self Government Department, 2018). In an interview conducted with a Health Inspector of the Thiruvananthapuram Corporation, he said that collecting dry waste without segregating them into glass, paper, plastics, and so on will not be of any use for recycling. The corporation has declared a calendar based on which waste will be collected and this is implemented in few wards of the corporation. However, the Solid Waste Management Manual 2016 also states that local authorities should ensure door-to-door collection.

Another row the NGT has with Kerala is that the latter is disposing its solid waste in the neighbouring states of Karnataka and Tamil Nadu. It should be noted that while the MSWM Rules 2016 do mention setting up of material recovery facilities, they do not clearly mention that the recycling should happen within the ULB or within the state itself. Inter-state movement of waste is to be regulated by the CPCB. The waste converted into resource at Material Recovery Facilities and Resource Recovery Centers (RRC) is transported to recycling facilities, many of which are located in nearby states. In an interview with a ward counsellor in Thiruvananthapuram conducted in December 2019, the counsellor referred to instances where segregated waste (which is converted to a resource at the MRFs and RRCs) was dumped on the roads by agencies who take a tipping fee from the corporation for collecting the waste. The interviewee said that they may find perverse incentives such as reduced transport and processing costs by dumping the wastes instead of recycling it.

3.4 Conclusions

It should be noted that the most of HKM's activities overlap with the activities conducted by the Suchitwa Mission. Waste management is just one of many focus areas of HKM. There is a need to study further how and whether these two missions complement each other given the aforementioned overlaps.

There are constraints faced by the state government in implementing its strategies. The Kerala State Sanitation Strategy, which was formulated adhering to the NUSP, states the need for greater clarity and guidance/advisory at the state level. While the NUSP advocates each state to develop its own ways, the Kerala State Policy on Solid Waste Management just echoes the norms of the SWM Rules 2016, which prescribes uniform solutions to states and ULBs across the country. If one were to consider the case of

Thiruvananthapuram Corporation's approach to handling biodegradable wastes at source and only treating overflow waste by providing community level waste processing facilities, it can be observed that this approach is inconsistent with the SWM Rules which requires all segregated waste to be collected from door to door. The conflict between the NGT and Thiruvananthapuram Corporation has been discussed in the previous section. Thiruvananthapuram has now decided to opt for centralised waste treatment plan in addition to its decentralised facilities to comply with the norms of the central government (Mohan, 2020).

Hence, it can be hypothetised that adhering to the norms of the central government is perceived as more important than choosing the appropriate strategy that works for the state in effectively managing the waste of the region.

CHAPTER 4
4. Limitations of the study

The present study only looks at solid waste management in urban areas (i.e., municipal solid waste management) and not at the institutional structure of governance in solid waste management in rural areas. No solution has been provided by the study to solve the issue of conflicts between various stakeholders that have been discussed in the study. The study has extensively taken information from official government websites regarding the roles and responsibilities of the concerned agencies. Only two complementary interviews (with a government official and a local representative of Thiruvananthapuram Corporation) could be conducted for the study. More interviews could have given deeper insights into ground realities and nuances.

References

Abrol, R., & Bedenik, L. (2019, July 1). *The Print*. Retrieved June 8, 2020, from The Print.in: https://theprint.in/opinion/modi-govts-swachh-bharat-shows-why-switching-to-mission-mode-is-helping-india/256156/#:~:text=Greater%20attention,political%20priority%20to%20public%20officials.&text=Most%20public%20officials%20agree%20that,focus%20groups%20re

Aich, A., & Ghosh, S. K. (2019). Conceptual Framework for Municipal Solid Waste Processing and Disposal System in India. In S. K. Ghosh, *Waste Management and Resource Efficiency* (pp. 91-107). Singapore: Springer.

Cairney, P. (2014, March 28). *paulcairney.wordpress*. Retrieved June 8, 2020, from paulcairney.wordpress.com: https://paulcairney.wordpress.com/2014/03/28/policy-concepts-in-1000-words-institutions-and-new-institutionalism/#:~:text='Institution'%20may%20in%20the%20past,as%20legislatures%2C%20courts%20and%20executives.&text=Their%20regulatory%20frameworks%20%E2%80

Centre for Science and Environment. (2018, June 7). *CSE India*. Retrieved June 4, 2020, from CSE India.org: https://www.cseindia.org/cse-releases-its-rating-of-selected-cities-which-manage-and-segregate-their-waste-most-efficiently-8748

Centre for Science and Environment. (2018). *To Burn Or Not To Burn- Feasibility of Waste-to-energy plants in India.* New Delhi: Centre for Science and Environment .

Chhotray, V., & Stoker, G. (2009). *Governance Theory and Practice A Cross Disciplinary Approach.* New York: Palgrave Macmillan.

CPCB. (2016). *The National Action Plan For Solid Waste Management.* New Delhi: Ministry of Environment Forests and Climate Change.

CPCB. (2020, July 7). *ENVIS Centre on Control of Pollution Water, Air and Noise* . Retrieved september 26, 2020, from ENVIS Centre on Control of Pollution Water, Air and Noise : http://cpcbenvis.nic.in/water_pollution_main.html

CPHEEO. (2013). *Advisory on Improving Municipal Solid Waste Management Services.* New Delhi: Government of India.

CPHEEO. (2016). *Municipal Solid Waste Management Manual.* New Delhi: GoI.

CPHEEO. (2019, November 5). *CPHEEO.gov.in.* Retrieved June 2, 2020, from CPHEEO.gov.in: http://cpheeo.gov.in/cms/role-duties-of-cpheeo.php#:~:text=Assisting%20the%20Ministry%20of%20Housing,Parliament%20Questions%20and%20VIP%20references.

Daskalopoulos, Badr, & Probert. (1998). Municipal solid waste: a prediction methodology for the generation rate and composition in the European Union countries and the United States of America. *Elsevier*, 155-166.

DAY-NULM, MoHUA, & SBM. (2018). *Empowering Marginalized Groups -Convergence Between SBM And DAY-NULM.* New Delhi: Government of India.

Gidwani, V., & Corwin, J. (2017). Governance of waste. *Economic and Political Weekly*, 44-54.

Global recycling. (2019). Retrieved May 02, 2020, from Global Recycling: https://global-recycling.info/archives/2898

Haritha Keralam. (2016). *Haritha Keralam*. Retrieved June 2020, 1, from Haritha Keralam: http://haritham.kerala.gov.in/haritha-keralam/

Haritha Keralam. (2016). *Haritha Keralam*. Retrieved June 2020, 1, from Haritha Keralam: http://haritham.kerala.gov.in/haritha-keralam/

Haritha Keralam. (2016, November). *Haritham Keralam*. Retrieved June 2, 2020, from Haritham Keralam.Gov: http://haritham.kerala.gov.in/hygienic-waste-management/

Hodgson, G. M. (2006). What are institutions? *Journal of Economic Issues*, 1-25.

Joshi, R., & Ahmed, S. (2016). Status and challenges of municipal solid waste management in India: A review. *Cogent Environmental Science*.

Koundal, A. (2019, July 23). *Energyworld.com*. Retrieved June 10, 2020, from Energyworld.com: https://energy.economictimes.indiatimes.com/news/power/waste-to-energy-why-a-rs-10000-crore-industry-is-facing-issues/69685189

Kudumbashree . (2020). *Kudumbashree* . Retrieved June 2, 2020, from Kudumbashree : http://www.kudumbashree.org/

Local Self Government Department. (2018). *Kerala State Policy On Solid Waste Management.* Thiruvananthapuram: Government of Kerala.

Local Self Government Department. (2020). *Local Self Government Department*. Retrieved June 1, 2020, from Local Self Government Department.gov: http://lsgkerala.gov.in/en/lsgd/department/

LSGD. (2018). *State Policy on Solid Waste Management.* Thiruvananthapuram: Government of Kerala.

Mani, S., & Singh, S. (2016). Sustainable Municipal Solid Waste Management In India: A Policy Agenda. *Procedia Environmental Sciences*, 150-157.

Ministry of Urban and Housing Affairs. (2008). *National Urban Sanitation Policy.* New Delhi: Government of India.

MNRE. (2020, June 2). *MNRE.gov.in*. Retrieved June 2, 2020, from MNRE.gov.in: https://mnre.gov.in/the-ministry/what-does-the-ministry-do/

MNRE. (2020). *Revised guidelines of Waste-to-Energy Programme.* New Delhi: Government of India.

MoEFCC. (2020). *Parivesh*. Retrieved June 2, 2020, from Parivesh: https://parivesh.nic.in/About.aspx#:~:text=The%20Ministry%20of%20Environment%2C%20Forest,and%20forestry%20policies%20and%20programmes.

MoEFCC, G. o. (2016, April 5). *Press Information Bureau*. Retrieved May 2, 2020, from www.pib.gov.in: https://pib.gov.in/newsite/printrelease.aspx?relid=138591

Mohan, S. (2020, May 8). *The New Indian Express*. Retrieved June 10, 2020, from The New Indian Express:

https://www.newindianexpress.com/cities/thiruvananthapuram/2020/may/08/waste-
to-energy-plant-at-vizhinjam-sparks-protest-2140520.html

Mohankumar, S. (2002). From People's Plan to Plan Sans People. *Economic and
Political Weekly*, 1492-1497.

MoHUA. (2017, october 5). *Guidelines for Swachh Bharat Mission - Urban.* New Delhi:
Government of India.

MoHUA. (2017). *Ministry of Housing and Urban Affairs*. Retrieved June 1, 2020, from
Ministry of Housing and Urban Affairs:
http://mohua.gov.in/cms/mandate.php#:~:text=The%20Ministry%20of%20Housing
%20and,programmes%20concerning%20all%20the%20issues

MoHUA. (2017, october 5). Ministry of Housing and Urban Affairs. *Guidelines for Swachh
Bharat Mission - Urban*. New Delhi, New Delhi, India: Government of India.

MoHUA. (2020). *smartnet.niua.org*. Retrieved June 2, 2020, from Smartnet:
https://smartnet.niua.org/nulm

Mufeed Sharholy, K. A. (2007). Municipal solid waste characteristics and management in
Allahabad, India. *Waste Management*, 490-496.

Mutz, D., Hengevoss, D., Hugi, C., & Gross, T. (2017). *Waste-to-Energy Options in
Municipal Solid Waste Management.* Eschborn: Deutsche Gesellschaft
fürInternationale Zusammenarbeit (GIZ) GmbH.

Nandi, S. (2019, 09 02). *livemint*. Retrieved 02 25, 2020, from livemint.com:
https://www.livemint.com/politics/policy/india-slips-to-7th-position-in-global-gdp-
ranking-1564747117029.html

NIUA. (2020). *NIUA.org*. Retrieved June 5, 2020, from NIUA.org: www.niua.org

Osborne, D. (1993). Reinventing Government. *Public productivity and management
review*, 346-356.

Parikh, A. (2020, March 9). *MERCOM India*. Retrieved June 10, 2020, from
mercomindia.com: https://mercomindia.com/mnre-municipal-solid-waste-to-energy-
program-

guidelines/#:~:text=The%20objective%20of%20the%20program,feeding%20power
%20into%20the%20grid

Peters, B. G. (2015). *Advanced introduction to public policy.* Massachusets: Edward
Elgar Publishing Limited.

Planning Commission. (2014). *Report of the Task Force on WTE.* New Delhi:
Government of India.

Rachael E. Marshall, K. F. (2013). Systems approaches to integrated solid waste
management in developing countries. *Waste Management*, 988-1003.

Ratheesh. (2018). *Haritha Karma Sena- The green force of kudumbashree in action for
green kerala mission .* Thiruvananthapuram.

Rattani, V. (2018). Coping with Climate Change: An analysis of India's National Action
Plan on Climate Change. In V. Rattani, *Coping with Climate Change: An analysis of
India's National Action Plan on Climate Change* (p. 21). New Delhi: Centre for
Science and Environment.

Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a General Theory of Planning. *Policy
Sciences* , 155-169.

Rodic, L., & Wilson, D. C. (2017). Resolving Governance Issues to Achieve Priority
Sustainable Development Goals Related to Solid Waste Management in
Developing Countries. *Sustainability*.

S.N.M. Menikpura, J. S.-A. (2013). Integrated solid waste management: an approach for
enhancing climate co-benefits through resource recovery. *Journal of Cleaner
Production*, 34-42.

Sambyal. (2019, May 30). *DownToEarth*. Retrieved May 31, 2020, from
DownToEarth.org: https://www.downtoearth.org.in/blog/waste/what-swachh-bharat-
mission-2-0-should-be-like--64825

Sambyal, S. S. (2018, September 19). *DownToEarth.org*. Retrieved May 27, 2020, from
DownToEarth: https://www.downtoearth.org.in/news/waste/solid-waste-
management-rules-2016-53443

Sambyal, S. S., & Agarwal, R. (2017, October 12). *DownToEarth*. Retrieved May 28, 2020, from downtoearth.org: https://www.downtoearth.org.in/news/waste/swachh-bharat-mission-yet-to-create-systems-to-support-waste-segregation-processing-58773

Sambyal, S. S., Agarwal, R., & Shrivastav, R. (2019, April 23). *DownToEarth*. Retrieved June 4, 2020, from DownToEarth.org: https://www.downtoearth.org.in/news/waste/trash-fired-power-plants-wasted-in-india-63984

Shah, K. V., & Shah, D. D. (2019). An Approach Towards Sustainable Municipal Solid Waste Management in India. In S. K. Ghosh, *Waste Management and Resource Efficiency* (pp. 1067-1076). Singapore: Springer.

Suchitwa Mission. (2015). *Kerala State Sanitation Strategy.* Thiruvananthapuram: Government of Kerala.

Suchitwa Mission. (2017). *Suchitwa Mission*. Retrieved June 2, 2020, from Suchitwa Mission.in: http://sanitation.kerala.gov.in/

Swaminathan, M. (2018, April 20). *How Can India's Waste Problem See a Systemic Change*. Retrieved December 13, 2019, from Economic and Political Weekly Engage: https://www.epw.in/engage/article/institutional-framework-implementing-solid-waste-management-india-macro-analysis

The Hindu. (2019, July 29). Retrieved 12 20, 2019, from The Hindu: https://www.thehindu.com/news/cities/Thiruvananthapuram/corporation-preparing-waste-management-plan/article28740596.ece

The World Bank. (2020). *data.worldbank.org*. Retrieved April 14, 2020, from data.worldbank.org: https://data.worldbank.org/indicator/SP.POP.TOTL?locations=IN-1W

Towie, N. (2019, February 28). *The Guardian*. Retrieved June 4, 2020, from The Guardian.com: https://www.theguardian.com/environment/2019/feb/28/burning-issue-are-waste-to-energy-plants-a-good-idea

UNEP, & ISWA. (2015). *Global Waste Management Outlook.* United Nations Environment Programme.

V.K.Ramachandran. (2018). Economic Planning in Kerala. *Critical Asian Studies* , 155-163.

Vaish, B., Srivastava, V., Singh, P., & Singh, A. (2016). Exploring untapped energy potential of urban solid waste. *Energy Ecology and Environment*, 323-342.

Véron, R., Fernando, N., Narayanan, N. C., & Upreti, B. R. (2018). Social processes in post-crisis municipal solid waste management innovations: A proposal for research and knowledge exchange in South Asia. *Research Ideas and Outcomes* .

Wankhade, K. (2015). Urban sanitation in India: key shifts in the national policy frame. *Environment and Urbanisation*, 555-572.

World Energy Council . (2013). *Waste to Energy.* London: World Energy Council.

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