

Knowledge and attitude of Generator on segregation of Solid Waste: A Case of Sector 38, Gurugram

Pradip Kumar Nath, G D Goenka University, School of Humanities and Social Science, Gurugram

Dr. Rimple Manchanda, Assistant Professor (Economics), SoHSS, G D Goenka University, Gurugram

Abstract

Waste materials are generated by all types of human activities which are generally discarded as useless, unwanted. Normally these wastes are solid. Many among these have the potentiality to be reused, and there is possibility of the same to be reused in further production of goods for consumption. Sources of solid wastes' generation in any community are related to land use and zoning. Waste management has become one of the important problems of our time due to its' increasing amounts as a consequence of development witnessed in our country after independence. In order to assuage the issue, present government came out with the Solid Waste Rules, 2016 along with some other rules to tackle the waste issues related to plastic, e-waste, construction and demolition waste and medical waste. One of the most important aspects of Solid Waste (SM) Rules, 2016 is the segregation of the same at the level of the generator and not down the stream. In order to test the efficacy of this principle of segregation at generator's level, the present study was taken up in few areas of Gurugram. Here the study and the findings about Sector 38 in Gurugram is presented. The study attempts to find why people at large do not segregate the waste before disposing it off.

Key Words

Ethnography, Generator, Gurugram, Post Modernism, 3R, Segregation, Solid Waste, Solid Waste Management Rules 2016,

Introduction:

Historically the issue of Solid Waste is generally regarded to be an issue of Local Governance in the urban area. The very connotation of the term Solid Waste prefixed with Municipal (Municipal Solid Waste; MSW) in writings & researches signify its' understandings among the masses, decisions makers and the academicians about its' delimitations to the urban areas. The understandings of solid waste as an off-shoot of the process of modernization (which started in late 17th century), industrialisation and urbanization in a linear pattern happens to be the historical path of Development in the last few centuries. The development path followed by the newly independent nations in the 20th century continued to be in line with the global

order of development and growth based on scientific temper which was the hallmark of renaissance and consequential modernization. In this, the resultant outcome not only saw higher life expectancy in many countries but also the impact of this new way of living with higher quantity and variety of uses of material wealth of mother earth. Use of more and more resources for the survival became one of the ideals of modern life. More use of resources means more creation of materials to be discarded as waste. Waste means which is rejected as useless, unneeded or excess to requirements (Chambers 20th century dictionary). Theoretical perspective of modernizations clearly explains when, why and how solid waste is created in a locality inhabited by people. Twentieth century also witnessed the challenges of modernization which resonated in international conferences (like the Rio summit in 1992) and research papers (like Limits to growth) calling for urgent action in the unsustainable nature of the development model followed so far. In this narrative of development and sustainability, solid waste management plays a significant role which has drawn attention of every country irrespective of their development level and governance structure. Sustainable Development Goal 11 and 12 (SDG, 2015-2030) elaborates explicitly about solid waste management. Taking a cue from the Sendai framework of action for Disaster Risk Reduction (2015), solid waste with its' potentiality to be a disaster, government of India has come out with its' legal frame work in 2016. Apart from the general frame work of Solid Waste Management Rules 2016, it has also brought in rules for electronic wastes, plastic wastes, construction & demolition waste and the electronic waste.

In 2016 SWM Rules, there is a paradigm shift in fixing responsivity upon the generator rather than the agency responsible for waste disposal and the removable of the word Municipal and making solid waste more holistic taking cognizance of its' spatiality. This paradigm shift resonates Foucault's statement of "Space as the fixed, the undialectical, the immobile and time, on the contrary representing richness, fecundity, life and dialectic" (Foucault, 1980). Contextualizing solid waste, it is as much important to ask on when, why and how it is created in the very first place and how sooner it is to be disposed off, so also it is important about its' spatiality that is where it is created and where it is disposed off. This simultaneous consideration of space and time in relation to viable disposal of solid waste comes as a corollary to what Soja (1989) calls social production of space. (Soja, p- 11). In the process of 'restless formation and reformation of landscape', to use Soja's coinage, solid waste find its' geographical loci in a special context of time, space and the social being.

Methodology

If modernism perspective gives credence to the solid waste creation, the post modernism helps us to comprehend the multiple ways in which SWM problem is attempted to be solved and how human action is prioritized. Even the ways people understand and visualize solid waste is so multilayered that their behavioural pattern may not be captured with survey research methodology alone and that's why the ethnography has been utilized for the same study here. In order to capture the multiple truths in the lived life

of people's reality as to why people do not stick to segregation of solid waste, mixed methods design is adopted with use of techniques from qualitative and quantitative methods to answer research questions. For the study, Gurugram town has been selected and purposively the localities constituting Sector 38, Islampur village, Sector 39, Jhadsa village have been selected. Gurugram with its' typical cosmopolitan characteristics, still held some villages within it's fold with typical characteristics of Indian village with their subtle nuances of social cohesion, cultural tie-ups and bondage. The two villages Jhadsa and Islampur have been selected for the study which is located in front of and behind the Medanta Hospital (Medicity) respectively. This modern Health Centre in India brings a large international population who generally prefer to stay nearby and the two sectors Sector 38 and Sector 39 developed adjacent to the villages and beside Medanta give a representative site to study the pattern of behavior towards the new provision of the rules on segregation of solid waste at the point of origin that is at the generator's level that is the first point of collection of domestic solid waste (HSW).

The social constructivist epistemology with postmodern theoretical perspective is the foundation of this research study. How the behavior of the household as the unit of domestic solid waste creation is constructed with specific concern of segregation of the solid waste.

Objectives

1. To study solid waste management practices by Households in Gurgaon
2. To identify the responsibility of Households in segregation and find the gaps
3. To analyse the knowledge, and attitude of Households (as generator of solid waste) towards segregations

Review of Literature

Concern for MSWM has of late taken serious turn after international deliberations in Post-Rio era converging on issues of world resources and the new paradigm of development in different parts of the globe (Climate Change & SDG being the main agenda of Policy Planning in different countries). The issues though remain the same for both developed and underdeveloped countries, the priority mitigation of these problems vary across nations and regions.

The spatial analysis of the problems of solid waste are analysed by Afon (Afon 2007;), Al-Khatib (Al-Kkhatib et al 2010;), Chung (Chung et al 2001;), Damghami (Damghani et al 2008;), and others. Barro Boys (Afon), an informal sector arrangement in Nigeria for waste picking, public private alliances (Baud et al 2001;), low budgetary allocation in Calcutta (Hazra et al 2009;), low level of responsibility of local authority (Manaf et al 2009;), lack of policy and strategies and financial support in Indonesia (Meidiena et al 2010;), lack of environment education campaign in Cuba (Mosler 2006;), 'pay as you generate' principle in Port Harcourt (Ogbonna et al 2007;), local level unrest in Nigeria (Ogwueleka 2009;) demanding more wages (the waste pickers and others engaged in SWM), evaluation of the low levels of legislative enforcement of

Malyasian law - i.e. Solid Waste Bill 2007 (Periathamby et al. 2009;), violation of MSW 2000 Rules in India (Sharholly et al 2008;) are the major highlights of institutional mechanisms operating in different countries. The issue of governance (of MSWM) manifests in poor visibility of law and its implementations.

Case Studies

Some case studies throw new light on specific spatial issues, Chavan (Chavan et al 2013;) explores the possibility of energy recovery from solid waste, poor working conditions of the waste collectors, their health hazards, health risks from leachate in Solapur district of Maharashtra. Furedy (1992) analyse case studies of five cities raising pertinent questions of resource recognition and arrives to the conclusion that Asian cities have potentiality to reduce waste volumes through improving conventional engineering system, citizen initiatives. Martin studies the case of Borough in England to highlight the household's willingness to participate and recycling. Nemathanga (Nemathanga et al 2008;) while analysing hospital waste management corroborates the view of other authors on effective waste segregation (Al –Khatib et al 2010, Damghani et al 2008; Guirrero et al 2013;).

Different types of solid waste and their disposal has been resolved in the writings of different scholars viz Widemer (Widmer et al 2005;) on Waste Electrical and Electronics Equipment (WEEE), Annepo (Annepu R. K. 2012;) on plastic. Landfill and its maintenance has critically been looked into by many of the researchers (Barton et al 2008;), Damghani et al 2008; Giustei, Kumar et al 2009; Mahar et al 2007; Narayana 2009;). Construction and demolition waste (Nitivattananan et al 2008) highlights the issue of 3R (Reduce, Reuse and Recycle) knowledge hub in the rising construction sector.

Human Perception & Behaviour

Human perceptions and behaviour on solid waste is an important area which is the main concern of the present research. “Historically, waste management has been an engineering function”. (Tchobanoglous, G. 1.2). In relation to technological society, the benefits of mass production, has also created the concomitant problems of disposal of solid wastes. (Tchobanoglous, G. 1.2). In reality very less number of researches have been devoted to this aspect though it finds resonance in most of the countries' legal framework. The New Environmental Paradigm (NEP) (Dun Lap et al 1978 ;) has been utilized by Chung et al (2001) to understand the human understanding about nature. Recycling and reusing activity of the households and their behavioural pattern has been the main highlights of De Young (De Young 1986;) for a locality in Michigan. The school management of Solid waste in Ogun state of Nigeria emphasised the need of behavioural and attitudinal change and environment education (Ifegbesan,2010).

Studies in India

Studies in India (Gupta et al 1998; Hazra et al 2009; Narayana et al, Pappu et al 2007; Sharholly et al 2008; Kumar et al 2009; Srivastava et al 2005; Talyan et al 2008; Zhu et al 2008 ;) speak about different viable technical ramification of SWM. Lack of viable data, the principle of 3R (Reduce, Reuse and Recycle), chronic problem of open dumping and landfill are the main issues (Morrissey et al 2004; Pires et al 2011;) builds the analysis on models of MSW, while analysing optimisation model, cost benefit analysis, life cycle analysis, multi-criteria technique. Morrissey et al (2004) concludes that waste treatment techniques ignoring social aspects was doomed to failure. He asserts that none of the models identified considered for involvement of all stakeholders viz. government, local authorities, technical experts and communities. Pires (Pires et al 2011 ;) uses system analysis for solid waste management bringing forth system assessment tools for European countries.

SOLID WASTE MANAGEMENT RULES, 2016 **Salient Features**

Revamping the Municipal Solid Wastes (Management and Handling) Rules 2000, the government brought in the new Solid Waste Management Rules, 2016 with the following salient features. The new rule extended the area under its' jurisdiction beyond the "Municipal area" and accordingly the word municipal has been removed. Now the rules will be applicable to all urban local bodies from Mega city to rural areas at Panchayat level, all outgrowths in urban agglomerations, census towns as declared by the Registrar General and Census Commissioner of India. They include the following areas.

- a. Notified areas,
- b. Notified industrial townships,

The rule also applies to all areas in the control of central governments like Indian Railways, airports/airbases, Ports and harbours, defence establishments, special economic zones. State and Central government organisations, tourism sites for pilgrims, of religious and historical significance as notified by respective State government, every domestic, institutional, commercial and any other non - residential solid waste generator situated in the areas.<http://moef.gov.in/wp-content/uploads/2017/08/SWM-2016-English.pdf> (p-52)

The Waste Generators include every household, event organizers, street Vendors, RWAs & market Associations gated Community having more than area 5000 sq. meter & Hotels & restaurants, etc.

Duties of Waste generators and Authorities are clearly defined and the timeline is set for monitoring and evaluation criteria on a regular basis. Shifting the exclusive responsibility of local government and making the solid waste generator to participate in the process of Solid Waste Management, the new rules of 2016 mandates every waste generator to segregate waste and store separately. The generator is also required to

hand over the same to Municipal workers or authorized waste pickers. The new rules are very restrictive on throwing, burning or burying solid waste in open public spaces, outside premises, throwing into the drains or any water bodies. Waste generators are expected to pay a “user fee” to the authorized waste-collector provision of “spot fine” in cases of littering and non-segregation of the solid waste generated by them. <http://moef.gov.in/wp-content/uploads/2017/08/SWM-2016-English.pdf>

The responsibility of different authorities has been earmarked and here a large number of ministry and the authorities at different hierarchies have been pulled up for the task unlike all previous provisions in our country. Duties of Authorities at Centre and the lower level below it may be listed as follows.

Authorities	Responsibilities
Ministry of Environment, Forest & Climate Change	Monitor and review every year by constituting the ‘Central Monitoring Committee’
Ministry of Housing and Urban Affairs	Policy on SWM at national level and coordination with states and UTs, Assistance through Training, guidance and finance,
Departments of Fertilizers & Chemicals	Market promotion of compost with right proportion of sell of the two : fertilizer and compost
Ministry of Agriculture	Regulation of Fertilizer by Control Policy for prompting use of compost. Establishment of compost testing facility.
Ministry of Power	Tariff for power produced by W-T-E project.
Ministry of Non – Renewable Energy	Establishment of waste-to-Energy plants with adequate financial support like subsidy.,
Ministry of Rural Development & Ministry of Panchayati Raj	Ministry of Rural Development & Ministry of Panchayati Raj have been roped in to monitor the situation in the village level and other areas which not declared as urban as such.
Secy-In- charge, UD (state/UT)	State level Guideline at state level, and Strategy, adoption of 3Rs (Reduce, Reuse, Recycle), suitable action for landfill site,

District Collector/Magistrate	District level landfill site identification, Review of local bodies every quarter on progress of SWM.
Central Pollution Control Board State Pollution Control Boards / the Pollution Control Committees	Coordination by CPCB of State and lower level authorities,

Source: <http://moef.gov.in/wp-content/uploads/2017/08/SWM-2016-English.pdf>, (p - 55- 61)

The three tier panchayat raj system and the 73rd amendment ensure the participation of the staff and the elected members in ensuring the vision of the state at the grassroots level.

Local Authority at each tier of the Panchayat will be responsible for preparation of the Solid Waste Management (SWM) with mention of the time line and its implementation. Segregation at the generator's level, adoption of the principle of 3-Rs, material recovery, processing/ disposal of Waste, imposition of user fee and levying spot fine will be other task to be rendered effectively by these local authorities.

Source - <http://moef.gov.in/wp-content/uploads/2017/08/SWM-2016-English.pdf> (p-62)

Manufacturers/Brand owners have been tasked with creation of facilities to collect back wastes of their products and provide pouch for packaging the sanitary wastes, etc. Industry like cement and power plant shall use RDF within 100 km. Considering the large tract of our territory in Hilly region and their importance from the economic and strategic points, the pronouncement have been made in the rules to avoid landfill, make waste transfer stations, stringent action against littering and construction of landfill at plain areas. Waste with high calorific value that is above 1500 Kcal/kg and above need be utilized by Waste to Energy plant for co- incineration in cement and power plants.

Time line for different activities like landfill identification (within a year), procurement of waste processing facilities (within two years), ensure segregation of waste(within two years), cities up to 1 million population(within two years), million plus cities (within 3 years), setting up sanitary landfills (within 3 years), bioremediation/capping of old landfills (within five years) have been fixed. <http://moef.gov.in/wp-content/uploads/2017/08/SWM-2016-English.pdf> (p- 62 - 64).

With this background the research findings of Sec 38 is critically analysed here with 50 households being covered with in depth interview. The structured questionnaire has also been utilised with ethnographic study and focus group discussion. The participant observation over a long period of more than two years created

the right ecosystem to look into the inner self of the people about the attitude towards solid waste and the recent government mandate to segregate the same as wet and dry.

Findings

and

Analysis

(A) Household Profile

(1) Out of the 50 respondents taken through purposive sampling 11 (22%) were female and rest male.

(2) 14 respondents own the house they stay and others were on rent.

(3) Caste composition - SC 5(10%), OBC 19(38%) and General 26(52%)

(4) 43 Hindu, 7 Sikhs.

(5) Average size of the family is 7.06 with highest number as 16 and lowest as 03.

(6) Education of Household Head (HH)

Above Graduate	Post Graduate	Post Graduate	Graduate	+2	Matric
4 (08%)		3 (06%)	23(46%)	15(30%)	15(30%)

(7) Income and Employment

Own Business is 31, Private employment is 25, earnings from house rent is 43, Government employee is 12, informal business is 1 and Unemployed is 2.

(8) Income of the Household (In Rs.)

Above 500,000	100,00 – 50,000	–
	500,000	100,000
21(42%)	28%	1(2%)

(B) Knowledge and attitude about SW Rules, 2016 and segregation of SW

(1) Knowledge level score was less than 25 out of 100 for any of the respondents in the classification of solid waste into dry, wet, domestic hazardous and e – waste and biomedical waste.

(2) 3 respondents (6%) out of a sample of 50 only have knowledge about segregation.

- (3) Source of information imparted about segregation was either from local leader (Pradhan) or the community leader.
- (4) People are aware of about the payment to be made towards solid waste collection from their doorstep.
- (5) 46% respondents only are aware of the penal provisions for throwing solid waste in open spaces.
- (6) None of the respondents have ever been informed or reminded to do segregation.
- (7) Score of knowledge about process that different type of solid waste (viz. dry, wet, domestic hazardous, medical waste) undergoes after being collected from the generator is very low. None could cross 25 out of 100. 44% even do not know if anything is or can ever be done except dumping any of the wastes into a landfill.
- (8) Average quantity of solid waste generated: (a) Average weight per capita per day is 0.716 kg,
(b) Per household Construction & Demolition (C & D) waste is 356 kg in a year.
- (9) Average number of Plastic bags / Card board / Bins used per household in a week. (Plastic bag - 15.5, Cardboard boxes - 3.21, Rubbish Bins or Drums used are - 4.3)
- (10) All respondents (100 %) deposited waste through the authorised collector, none in large bin. But 14 households (28%) also reported that paying Guest (PG) accommodated inmates and some households on rent throw their solid waste in open space utilising the service of their maidservant and manservant. RWA President has drawn the attention of all towards this.
- (11) Eco Green is the authorised waste collector by Gurugram Municipal authority in this sector, who collects the solid waste from sector 38 and collects a monthly fees of Rs.50/ per household. (Rate is Rs. 50/ for each floor in a house).
- (12) One respondent expressed his full satisfaction (2%), 24 (48%) are partially satisfied, 15 (30%) respondents are indifferent, 6 (12%) are dissatisfied, 4 respondents fully dissatisfied in the solid collection collected by the authorised waste collector.
- (13) Main reason of dissatisfaction with waste collector: 46% say it as unreliable and 23% for improper collection. Main reasons for satisfaction are that he is Cooperative (100 %).
- (14) Why people do not or can't segregate: To this question 46 (92%) respondents informed about lack of time to do the same, all respondents (100%) informed that they are neither ready nor capable to segregate the solid waste into dry and wet, 29 (58%) informed that by persuasion they can do anything with this waste collector and deposit the waste to the collector for final destination to the landfill at Bandhwari.

(15) Spending towards maid servant by the respondents.

Payment to Maidservant/manservant

In Rs.	No of repondents
500-1500	27(54%)
1500-3000	16(32%)
3000-5000	3(10%)
Above 5000	4(8%)

(16) All the respondents say that they will be compelled to segregate if there would be penal provisions like not lifting the solid waste without segregation or if higher charges would be levied for non-compliance of the same rule.

17) The maximum amount on an average the respondents are spending towards solid waste disposal is Rs.1195/ and minimum amount is Rs. 587/. This is over and above the regular payment of Rs.60 per month.

Findings from the FGD, Participant observation:

The Jot Diary, Field Diary, Expanded Notes used during data collection and the Focus Group Discussion (FGD) reveal the following.

- a. Even if people give the segregated waste, it is again mixed up and taken finally to Bandhwari Land fill site. So what is the point of segregation?
- b. People are ready to pay any higher amount towards a robust solid waste management with segregation at the generator's level.
- c. Householders being busy, the real segregation would be done by the housemaid/manservant duly supervised by the household female head they should be imparted right training and government authorities should organise hands-on training.
- d. Fees need be levied either on the criterion of quantity of solid wastes generated or the number of household numbers, some set principle like the charges levied for collection of construction and demolition wastes. It should not be a flat rate. This is for wet waste. The dry waste need to be collected weekly once or twice separately and the domestic hazardous waste and e- waste need to be collected at a specific time gap as decided by the Residential welfare association and communicated duly to the authority.

e. As per the residents dealing with patients accommodation the hospital waste need to be collected separately from sector 38, since many of the households rent out for patients and their attendants due to the proximity to Medanta Hospital (Medicity).

f. Institutions like place of worship(Temple, Gurudwara, Namaz site), Resident Welfare Association, Self Help Groups, Parks maintenance committee need to evolve the strategies towards Solid waste segregation vide training and regular activities like the mock drills for the disaster preparedness.

g. The schools, anganwadi centres, schools nearby (within the sector area) need to start these exercise and they need to demonstrate the citizens how to segregate by maintenance of cleanliness in public places like park.

Conclusion

Though the segregation is the most sought after thing in every local body recently, due the mishaps here and there and the constant pressure of the legal agencies including the Green Tribunal, it is not taking any concrete shape at a national level. Sporadic success stories in Indore (Source Segregation), Bhopal and Dhenkanal (Material Processing), Kakinada (Technological Innovation), Bobbili (Biodegradable waste management, Gangtok (Plastic waste management), Gurugram (Construction and demolition waste), Pune (Sanitary waste management), or any other may be inspiring stories for teaching and training, but replication of each of these models in every nook and corner of the country is the task ahead that needs urgent attention. The problems of Landfill and the resistance of the people nearby being affected with high health hazard and an impending disaster like situation has accentuated the importance of segregation at the source.

References:

1. Foucault, M. (1980). *Power/knowledge: Selected interviews and other writings, 1972-1977*. Vintage. 63-77
2. Soja, E. W. (1989). *Postmodern geographies: The reassertion of space in critical social theory*. Verso. 10-12
3. Tchobanoglous, G., & Kreith, F. Handbook of solid waste management. 2002.1.1-1.3
4. <https://cpcb.nic.in/displaypdf.php?id=d2FzdGUvQyZEX3J1bGVzXzIwMTYucGRm>
5. <https://cpcb.nic.in/displaypdf.php?id=cGxhc3RpY3dhc3RIL1BXTV9HYXpldHRILnBkZg>
6. <https://www.cseindia.org/how-are-indian-cities-managing-their-waste--11071>
7. https://dhr.gov.in/sites/default/files/Bio-medical_Waste_Management_Rules_2016.pdf

8. <https://greene.gov.in/wp-content/uploads/2018/01/EWM-Rules-2016-english-23.03.2016.pdf>
9. <http://www.iwma.in/HWM%20Rules.pdf>
10. <http://moef.gov.in/wp-content/uploads/2017/08/SWM-2016-English.pdf>

