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STAKEHOLDERS BEHAVIOUR TOWARDS CLEAN INDIA MISSION'S NEW MUNICIPAL SOLID WASTE COLLECTION SYSTEM IN CHANDRAPUR CITY, CENTRAL INDIA

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Abstract

The study was carried out to analyze behavioural pattern of stakeholders—inhabitants of Chandrapur city as well as employees of Chandrapur Municipal Corporation (CMC)—towards the “Clean India Mission” scheme as compared with previous scheme of women’s self help group. For behavioural change analysis field survey was carried out in October 2015 in Chandrapur city. Total 41 respondent including inhabitants and employees of CMC were interviewed. The results of the study shows that, previously municipal solid waste (MSW) collection was irregular (41.66%) however, since the implementation of this new scheme it has become regular (100%). Enhanced MSW collection frequency was observed (once a day, 83.33%) with alternative staff arrangement in case of staff is absent. The work was monitored by officials (79%) which were previously not existing. In previous scheme, extra money was charged for collection of MSW, however no such charges are levied in this new scheme. Satisfaction rate of this new scheme was 95.83% among inhabitants. As reported by MSW collection employees, there was awareness among inhabitants about dry and wet waste (41.17%). The employees were satisfied with the scheme (94.11%) as there is improved and timely salary with a job guaranty.

Keywords: Behavioural pattern, Central India, Chandrapur, Clean India Mission, Municipal solid waste, Solid waste collection

Introduction

The production of municipal solid waste (MSW) can be traced back since the beginning of civilization. Earlier, the disposal of solid waste was convenient and unobstructive due to less density of population and available of large open land. However, with rapid urbanization, the severity of MSW has increased. Increased in population density, significant land use for residential, industrial and commercial activities has lead to adverse impacts on environment. Noteworthy attention has been given to liquid and gaseous waste than MSW. The management of MSW is an important issue for a country. It involves activities associated with generation, storage, collection, transfer and transport, processing and disposal. MSW produced from household is removed by employee or owner and later by municipal staff. However, where such system of collection by municipal staff is not involved, the owner or employee dump this MSW in nearby community bin or at their convenient locations and sometime burn them also. These unethical practices had adverse impacts on environmental matrices. In number of municipalities from developing countries house-to-house collection of MSW system are practiced, the staff collects waste from individual premises where it is stored by owner. The collected MSW was disposed off in nearby community bin where a municipal vehicle will collect it and disposed off it at a designated location.

Sessa *et al* (2009) reported that risk of developing cancer due to solid waste burning was significantly higher in younger females with lower educational level than university. Those who differentiate household waste had university education level, perceived a higher risk of developing cancer, information about waste collection. Waste education and awareness strategy towards solid waste management at UKM showed that 60% of the students had positive attitude towards this. Students also showed high level of practices and responsibility regarding solid waste management (Desa, 2012). Investigation regarding factors influencing household recycling behaviour demonstrated that demographic attribute and socio-economic factors play a little role in waste separation. Environmental knowledge and attributes contribute to perception of people, their awareness and participation (Singhirunnusorn, 2012).

In Chandrapur city, collection of MSW was previously carried out (before June 2015) by a women's savings group. They use to form a small group of their own and with support of local authorities/peoples representative they use to collect MSW from household. For collection of MSW, they use to charge an amount (US\$ 0.30 to 0.46 per month) varying from different localities, commercial places, location of a house in an apartment floor, quantity of MSW generated, etc. They were not governed by rules and regulations laid down by municipal authorities' w.r.t. salary, time duration, leaves, number of household to be covered in a day, alternative staff arrangement, supervision from any authorities, no fear for losing job etc.

India's MSW generation has nearly tripled in the last five years. With the urban population growing at 3-5 per cent annually, the waste generated by cities is expected to increase by 5 per cent annually. India's solid waste generation was 50,592 tonnes per day (TPD) in 2010 and 143,449 TPD in 2015. Out of the total waste generated in the year 2015, waste collected for disposal was 117,644 TPD. Only 23 per cent of MSW generated in cities/towns is processed scientifically. MSW management in urban areas is a state subject. It is managed by municipalities or urban local bodies. Its monitoring is done by State Pollution Control Board. The Ministry of Urban Development supplements the efforts of state governments through schemes such as Jawaharlal Nehru National Urban Renewable Mission (JNNURM), North Eastern Regional Urban Development Programme (NERUDP) and Urban Infrastructure Development Scheme for Satellite Towns (UIDSST). Ministry of Urban Development aims at 100% scientific disposal of MSW by October 2019 (CPCB, 2015).

The Prime Minister of India had launched a "Clean India Mission" on 2nd October 2014 to make clean India in five years (2014-2019). Taking cognizance of this mission, Chandrapur Municipal Corporation (CMC) had launched this new MSW collection scheme from July 2015. Chandrapur municipal area is divided into three zones, 33 sections and 66 wards. There are total 400 MSW collection centres in the city. For transportation of MSW, the work is awarded to a private organization for a period of seven years. Total 22 vehicles are employed for collection and transportation of MSW. For transportation of MSW from three zones Chandrapur municipal council is paying @ Rs 755 (US\$ 11.61) per 1000 kg. The

previous self help group scheme was ceased and is replaced with this new initiative. This new scheme includes collection of MSW from household by municipal staff (daily wages staff). A designated supervisor (temporary staff) from CMC will monitor activities of these daily wages every day. For carrying out this MSW collection, staff is paid approx. Rs 300/- (US \$ 4.60) per day, with daily work schedule from 6 am to 2 pm, 26 days of compulsory work and 4 days of compulsory off in a month, collecting MSW from 350 households every day and at least six signatures in a predesigned proforma from them every day. The objective of this study was to assess behavioural changes in householders and CMC staff members after implementation of this new scheme of MSW collection so as to ascertain its future and contribution towards Clean India Mission.

Study area

Chandrapur formerly Chanda (19.57° N latitude and 79.18° E longitude) is a city and municipal corporation in Chandrapur district of Maharashtra state of India (Figure 1).

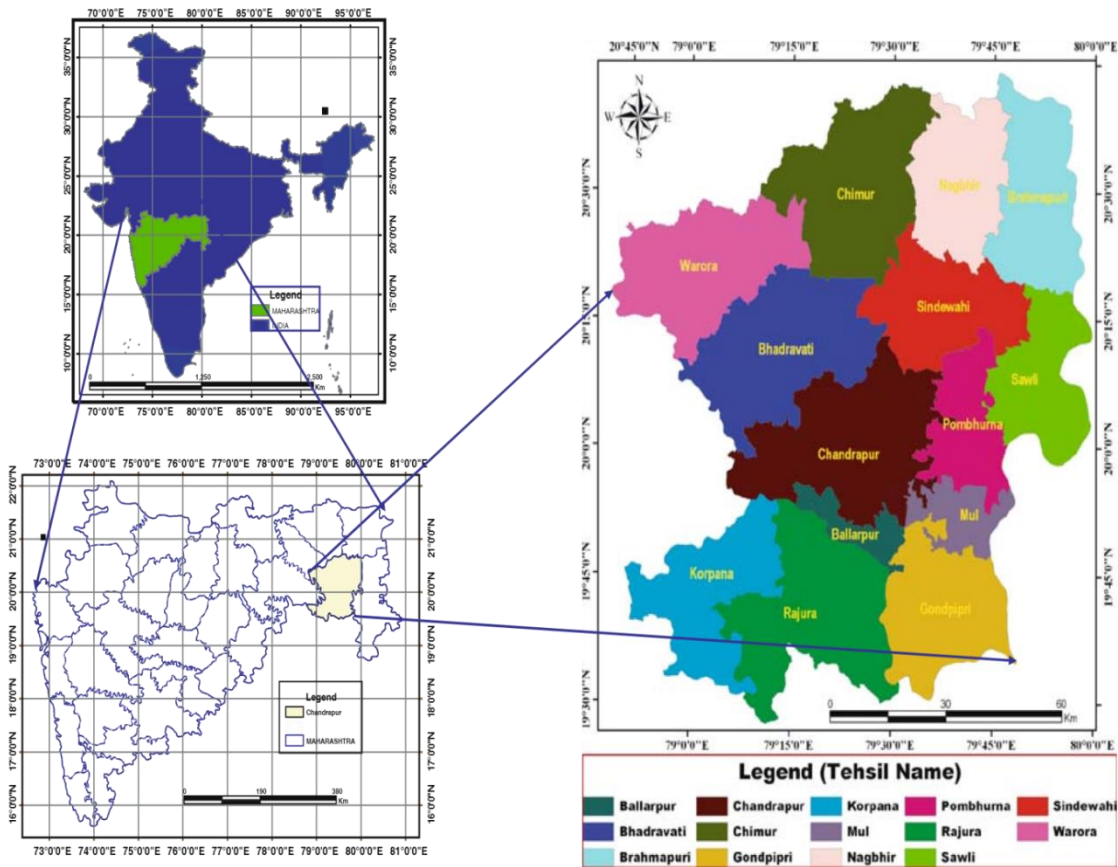


Figure 1: Chandrapur district in central India (Satapathy, 2009)

The city is located at the confluence of Irai and Zarpat river. The city has higher elevation at north side whereas lower elevation at south side. The city is situated at an altitude of 189.90 m amsl and has an area of 70.02 sq km. The north-south length of the city is about 10.6 km, while the east-west is about 7.6 km. According to 2011 census, the city had a population of 3,75,000. In a 2011 state cabinet decision, CMC was elevated to D grade Municipal Corporation. The city has 66 wards and divided into 3 zones.

In the city of Chandrapur mixed waste is generated and collected from houses, commercial complexes, shops, banks, offices, road sweepings etc. The wet waste is collected from houses and vegetable markets separately. MSW generated in the city is approximately 50 tonnes per day. A typical MSW from Chandrapur city comprises of biodegradable, non-biodegradable and debris matter.

Methodology

For assessing behavioural changes in stakeholders—householders and CMC staff—two different interview schedules were designed. The interviews of householders and municipal staff members were carried out in October 2015. For carrying out this study 24 individual householders were interviewed in different parts of the city ranging various socio-economic, religious and cultural backgrounds. These 24 individuals were all female—as they are the one who mostly deals with MSW. Out of 24 individuals, 20 (83.3%) were housewife, two retired, and one each from working and other background. For assessing behavioural changes in CMC staff members, 17 staff members were interviewed who belong to downtrodden communities (Scheduled Caste and Scheduled Tribe, 71%). The age of individuals who were interviewed was above 18 years. They were also interviewed from different localities of the city so as to understand behaviour of householders from different localities.

Results and discussion

After conducting householders and MSW collection staff survey through schedule interview responses are depicted in Figures 2-5. Householder responses are depicted in Figures 2-3. According to responses of householders, previously MSW collection was

irregular (41.66%) and after implementing this new scheme MSW collection has become regular activity (100%).

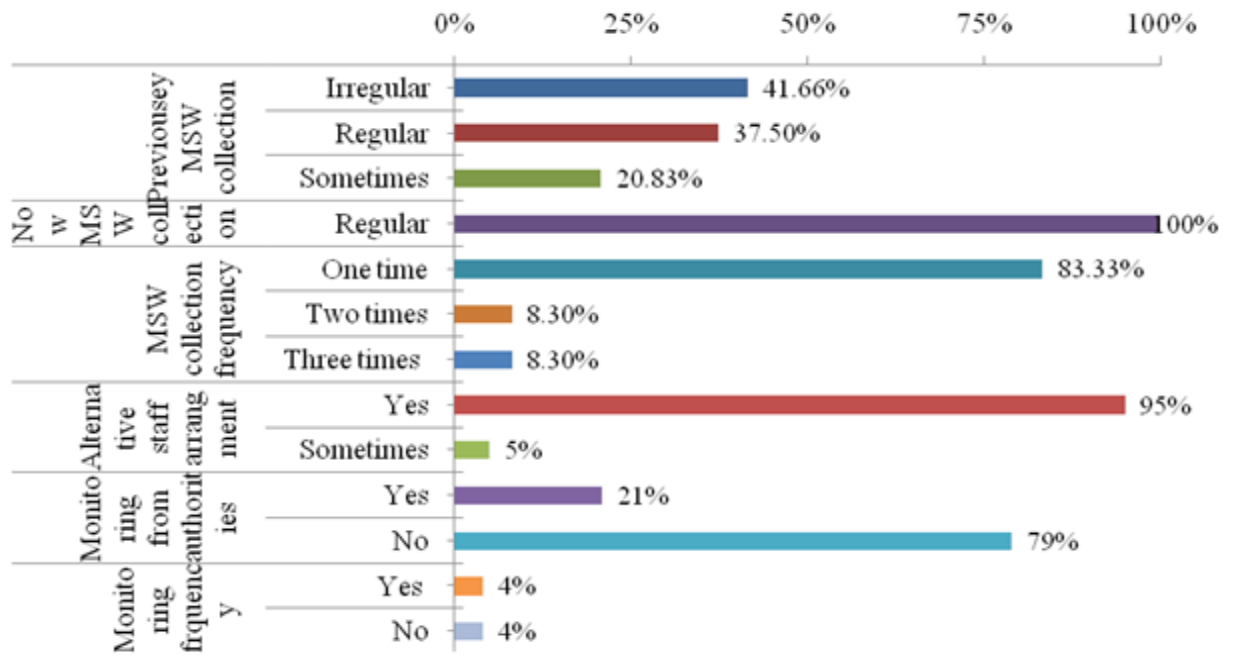


Figure 2. Householders response (1)

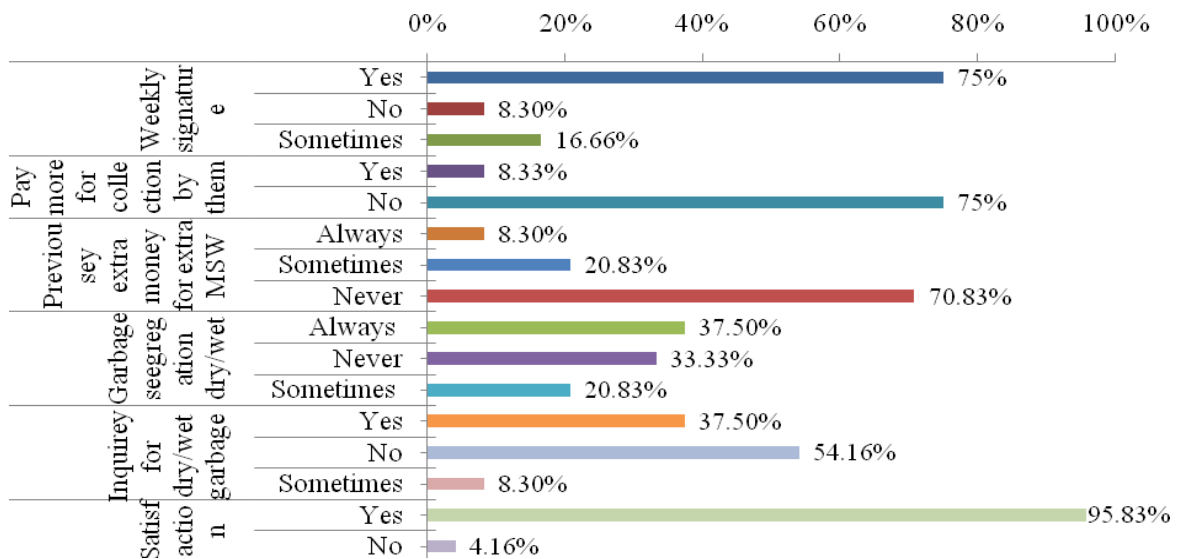


Figure 3. Householders response (2)

The collection frequency is once a day in maximum part of the city (83.3%), whereas in some parts twice (8.3%) and thrice (8.3%) was reported. Of the respondent, 95% reported that alternative staff arrangement was there. The activities of MSW collection staff was monitored by a supervisor, however, only 21% responded that they had observed this activity. Weekly signature collection from householders was reported by 75% of respondents. No payment has to be paid for collection of MSW to CMC staff (75%). Previously extra money had to be paid for extra MSW (~30% of respondents). Segregation of MSW in dry and wet form is an important part of MSW management and had observed in the city and ~60% of respondent segregate it into dry and wet form. Inquiry for dry and wet MSW by municipal staff was responded by 45% of staff members. The overall satisfaction of this new scheme was significantly positive and 95.83% respondents were satisfied with it.

MSW collection staff member responses are depicted in Figures 4-5. Of the respondents, 82.35% reported that they collect MSW by themselves which was kept outside the houses by householders, 11.75% sometimes, while 5.88% never collect it. It has been found that about 80.00% of householders voluntarily participate in MSW collection. When CMC staff members whistle for collection of MSW in front of their house or lane they voluntarily came outside of their houses for putting it into their cart. All respondents reported that they collect MSW only once a day. Previous charging of extra money for extra MSW was reported by 30% respondents. The collection of MSW from the city requires collecting it from independent houses, bungalows and multi-storey apartments. Difficulties faced for collection of MSW from multi-storey apartment was reported by ~60.00% of respondent. Of this 60%, about 6.00% had always faced difficulties. Regarding awareness for dry and wet MSW among householders, 41.17% of CMC staff had observed that inhabitants had some awareness about it—as cart has four bins for dry waste and two bins for wet waste with colour coding. Whereas disposal of dry and wet MSW in respective containers of cart, only 5.88% respondents always dispose it in the respective containers, 75.58% sometimes and 23.52% never. In case of absence of any CMC staff member on a particular day an alternative arrangement is always made (100%) by supervisor. Regarding satisfaction of this new scheme, 94% respondents reported that they are satisfied with this new scheme.

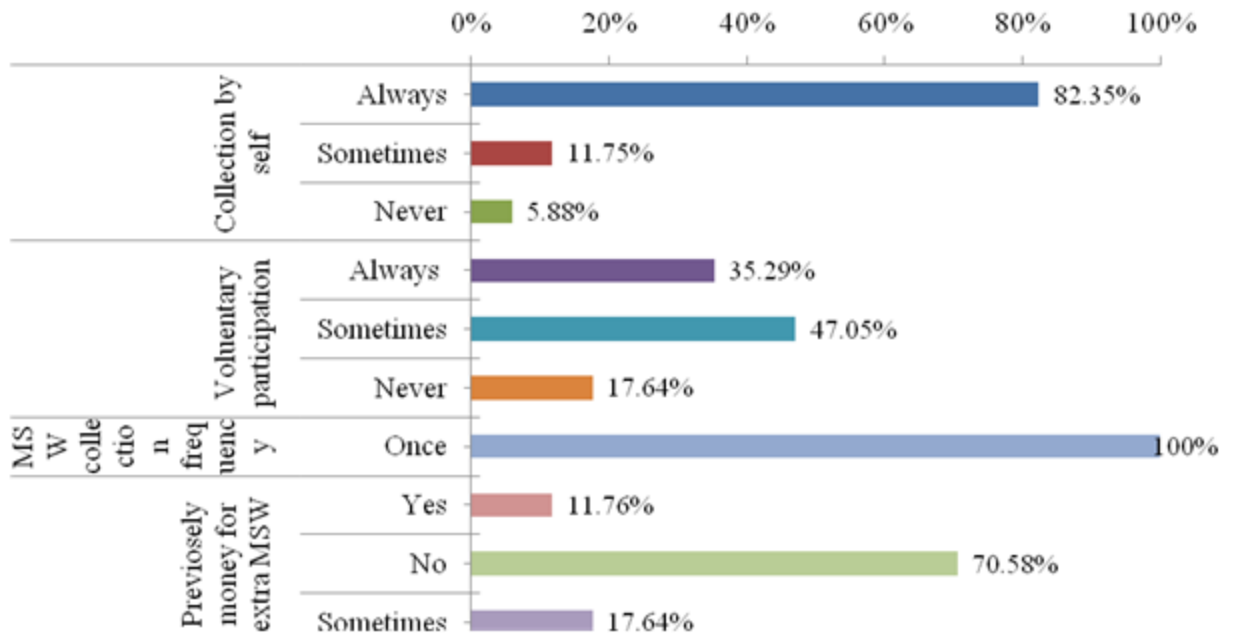


Figure 4. MSW collectors' response (1)

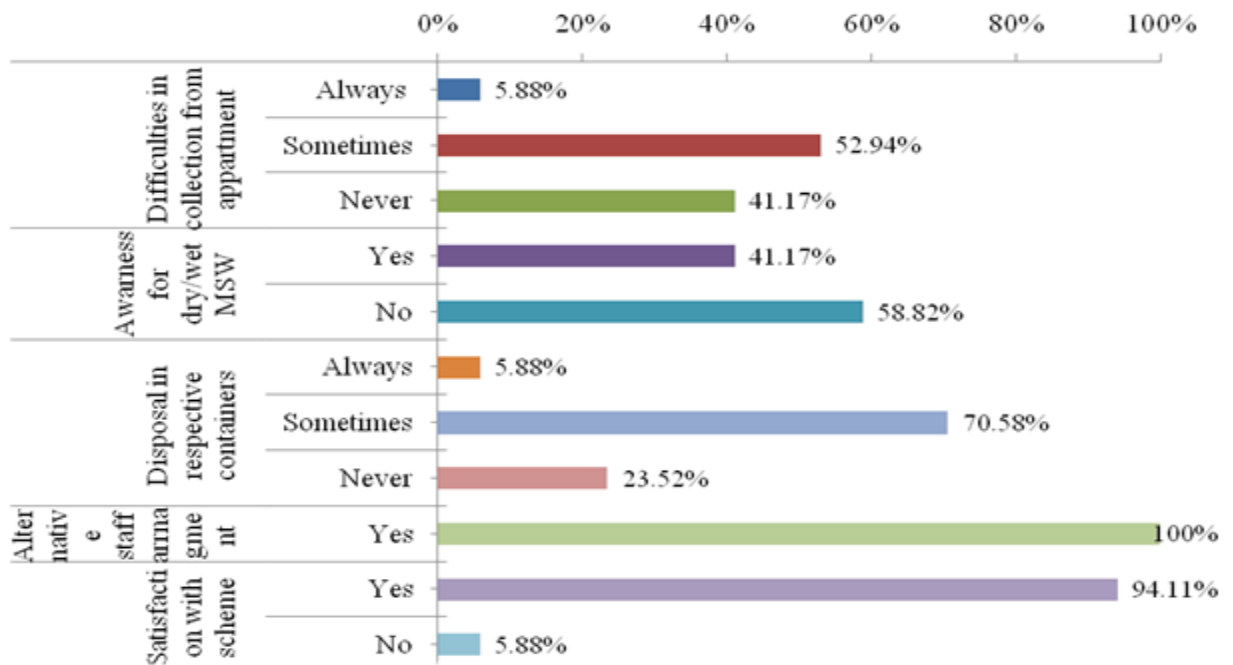


Figure 5. MSW collectors' response (2)

Behavioural changes

After implementation of this new scheme from June 2015 behavioural changes in stakeholders has been observed. Some of the significant behavioural changes in householders and CMC staff members has been observed and are as follows:

In householders

1. Previously householders use to throw MSW at their convenient locations, however since the implementation of this new scheme MSW is properly disposed off into respective containers in cart; as a result of which the city has become comparatively clean.
2. Since the implementation of this new scheme, CMC staff collects MSW on daily basis as a result of which daily collection and disposal storage of MSW in houses has reduced which previously was a routine observation when irregular collection of MSW was there.
3. The payment to CMC staff members for collection of MSW is made from municipal taxes which are collected from inhabitants of the city. As a result of this, some householders were reluctant to give signatures to these staff members.
4. Now daily MSW collection is carried out as a result of which householders had voluntarily participated in dumping of MSW.
5. The disposal of MSW at any unauthorized location is a punishable offence @ Rs 500 (US\$ 8), as a result of which behavioural changes were observed in householders and they do not dispose MSW anywhere.

In CMC staff

1. MSW collection has now become a daily activity which was previously absent in some parts of the city, irregular and was managed by women's savings group. Now CMC staff members are rendering their services on regular basis. Each zone has designated supervisors and additional supervisors with specific number of carts and additional carts for collecting MSW as presented in Table 1.
2. Staff members are more cautioned about their work as number of restrictions imposed by supervisors.
3. Every staff member has to execute duty in official uniform which was previously absent.

Table 1. CMC staff and vehicles for MSW collection

Zone	Supervisor	Additional supervisor	Cart employee	Additional cart employee
1-A	1	5	39	32
1-B	1	-	35	-
2-A	1	-	28	-
2-B	1	-	37	-
3-A	1	-	30	-
3-B	1	-	29	-
Total	6	5	198	32
Grand total	11		230	

4. Staff member collects MSW which was kept outside of the house by their own and even on Sunday has to collect it.
5. Since the implementation of this new scheme, monthly payment of staff is paid by CMC directly into their bank account.
6. As no money has to be charged for collection of MSW, staff members have to collect waste from each and every household irrespective of the quantity of MSW generated. As a result of this these staff members who use to earn more money previously has to face some financial losses.
7. It has been reported by CMC staff members that supervisor always threat them with removal from their job if they do not perform well as a result of this staff members were always under psychological stress.
8. The staff members are forced to take 4 days compulsory off in a month. However, they feel that rather than having compulsory off it should be made voluntary.
9. The duration of work in this new scheme is from 6 am to 2 pm. In-spite of completion of their work staff members were forced to sit upto 2 pm which was previously not like this.
10. As everyday staff members have to collect MSW from 350 houses which can be completed in 3-4 rounds in their designated area. After filling the cart with MSW, they had

reported that they face difficulties in pulling the fully loaded cart. Sometimes women who use to work in this new scheme ask their husband to help in pulling the fully loaded cart.

11. As it is mandatory to collect signature from householder as a proof for MSW collection, staff members were forced to get at least six signatures daily which has to be shown to supervisor.

12. Previously no salary was provided by any authorities to women's savings group, however, since implementation of this scheme a regular, one time, fixed salary and payment in bank account was done which had ensured a financial stability in their life. Previously women's savings group salary was based on number of household covered each day. Thus, each member used to get salary depending on number of houses covered by it. Thus variation in salary was observed.

13. It is mandatory to work 26 days in a month. Everyday attendance is marked at a fixed location and from where they start their work and after completion of the day's job they again have to gather at the same spot for reporting to the supervisor.

Conclusion

Stakeholder's behaviour analysis towards new solid waste collection method after implementation of Clean India Mission's was carried out. Stakeholders for this purpose were identified as householders and Chandrapur municipal council workers. After implementation of this new scheme, significant positive changes were observed in stakeholders towards MSW storage and collection. Separation of dry and wet waste has been observed at household level. However, the percentage is not significant (41.17%) but it is promising as the scheme has recently being started (less than six months). Behavioural changes w.r.t. MSW collection frequency, alternative staff arrangement, monitoring of authorities and frequency, awareness for dry and wet waste was observed. Overall a positive approach was observed in both stakeholders towards this new scheme and it holds promising future for a clean and green Chandrapur city.

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