

Social Work Intervention for Improving Domestic Solid Waste Management in Rural Area of North Goa

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1.0 Introduction

Solid waste represents a growing challenge at the global level that, when not adequately managed, poses risks to the environment and human health. The matter is particularly critical in low- and middle-income countries; indeed, such areas often face more economic and technical hurdles than industrialized countries. Moreover, people living in rural areas often encounter additional challenges making solid waste more difficult to manage. Notwithstanding, modern products and, consequently, new waste fractions have reached rural areas over the years. Indeed, plastic and e-waste can be found in such contexts. Unfortunately, people from rural areas often lack the proper awareness and tools to manage solid waste appropriately and turn to dangerous practices such as open burning or waste dumping. Although some rural communities have been trying to make resources from waste, recover precious flows and increase their revenues, they have been using polluting practices in many cases.

Proper Solid Waste Management (SWM) is a challenge for municipality to protect the environment and the wellbeing of human beings. If waste is not properly managed by municipalities or Local Governing Bodies, it may contaminate to soils, water and air thereby affecting the quality of life, human health and also creating threat to marine life as became a marine litter which may be a cause to create nuisance and marine life feel uncomfortable. The major components of SWM are waste generation, source separation, collection, transportation, processing, and disposal. At the first stage of waste generation, whereby source reduction strategies can be implemented which may be the initial step to manage the waste. In view of the above this study was carried out to determine the impact of social work intervention on domestic solid waste management in the rural areas of Goa State of India.

2.0 Research Methodology

2.1 Study Area – North Goa

North Goa is one of the two districts that constitute the State of Goa. North Goa District has 6 Blocks/Taluka out of which 2 Block/Taluka i.e. Bicholim and Sattari were selected based on number of villages in the taluka and according to rural setup.

2.2 Research Design – Interventional Research

In the present study an interventional research design was used. This study was based on A-B model of intervention research as the data collection and analyses was done at the pre-intervention stage and again same parameters were checked after intervention of the model.

Demographics of Sample

Selection of respondent from the Household

Universe consists of 1833 households and 14 wards in total. 10% household were selected from each village panchayat. That is total 183 household as respondents were the part of study at every stage with Stratified Random Sampling method. There are 7 wards in each village total of 14 wards were surveyed. Selection was done as per the proportion of households in each ward on the basis of random sampling method.

2.3 Collection of Data

In this study, all the data generation was done by using standard procedures. Data collection was carried out by using structured interview schedules (research instruments) and by following survey method. In the present study, Fixed Response (Qualitative) Rating scale /Continuum (such as Likert-type scale) were used. Reliability of the interview schedules was determined using a test-retest method. The reliability of the interview schedules was assessed prior to its use for data collection.

2.4 Statistical Analysis of Data

Analysis of data was done with the help of various statistical tests. The descriptive statistics, such as frequency, percentage, minimum and maximum, etc. were determined from the collected data. The inferential statistics such as **Chi-Square test** was used to analyze the primary data. All statistical analysis of the data is done with the help of Statistical Package for Social Sciences (SPSS) 24.0 Software. The significance level was chosen to be 0.05 (or equivalently, 5%).

3.0 Statistical Analysis & Interpretation

Awareness about waste management

3.1 Outlook about the solid waste disposal

Table 1: Outlook of villagers towards solid waste disposal as a real issue

Response	Pre-Intervention		Post-Intervention	
	Nos.	Percent	Nos.	Percent
Strongly agree	176	88	194	97
Agree	0	0	0	0
Can't Say	20	10	4	2
Disagree	0	0	2	1
Strongly Disagree	4	2	0	0
Total	200	100	200	100
	$\chi^2_{(cal)}: -567.4; df: 4,$ $\chi^2_{(crit)}: 9.49; p<0.05$		$\chi^2_{(cal)}: 741.4; df: 4,$ $\chi^2_{(crit)}: 9.49; p<0.05$	

Above **Table 1** shows responses of the villagers about the existence of solid waste disposal as a real issue in their villages. The data pertaining to same was collected before and after the intervention.

- **Pre-Intervention:** The data collected before the intervention showed that 88% villagers indicated their strong agreement towards the existence of solid waste disposal being a real issue in their village. However, 10% villagers were unsure about the same and meager 2% villagers feel that solid waste disposal is not a real issue. The Chi-Square test results show that significantly ($p<0.05$) high percentage of villages of study area i.e. Bicholim and Sattari Talukas of Goa consider solid waste disposal is a real issue.
- **Post-Intervention:** The data collected after the intervention showed that 97% villagers indicated their strong agreement towards the existence of solid waste disposal being a real issue in their village. However, only 2% villagers were unsure about the same and further 1% villagers feel that solid waste disposal is not a real issue. The Chi-Square test results show that significantly ($p<0.05$) high percentage of villages of study area i.e. Bicholim and Sattari Talukas of Goa consider solid waste disposal is a real issue.

3.2 Effect of Solid Waste on Health and Environment

Table 2: Opinion of the villagers with respect to unmanaged solid waste affects health and environment

Response	Pre-Intervention		Post-Intervention	
	Nos.	Percent	Nos.	Percent
Strongly agree	117	58.5	182	91
Agree	0	0	4	2
Can't Say	71	35.5	10	5
Disagree	9	4.5	1	0.5
Strongly Disagree	3	1.5	3	1.5
Total	200	100	200	100
	$\chi^2_{(cal)}: 270.5; df: 4,$ $\chi^2_{(crit)}: 9.49; p<0.05$		$\chi^2_{(cal)}: 631.25; df: 4,$ $\chi^2_{(crit)}: 9.49; p<0.05$	

Above **Table 2** shows responses of the villagers about the unmanaged solid waste affects health and environment. The data pertaining to same was collected before and after the intervention.

- **Pre-Intervention:** The data collected before the intervention showed that 58.5% villagers indicated their strong agreement towards unmanaged solid waste affects health and environment. However, 35.5% villagers were unsure about the same and meager 4.5% and 1.5% villagers feel that unmanaged solid waste does not affect health and environment. The Chi-Square test results show that significantly ($p<0.05$) high percentage of villages of study area i.e. Bicholim and Sattari Talukas of Goa consider that unmanaged solid waste affects health and environment.
- **Post-Intervention:** The data collected after the intervention showed that 91% and 2% villagers indicated their strong agreement towards unmanaged solid waste affect health and environment. However, only 5% villagers were unsure about the same and further 0.5% and 1.5% villagers feel that unmanaged solid waste affects health and environment. The Chi-Square test results show that significantly ($p<0.05$) high percentage of villages of study area i.e. Bicholim and Sattari Talukas of Goa consider that unmanaged solid waste affect health and environment.

3.3 Responsibility of waste segregation (dry-wet)

Table 3: Opinion of the respondents about responsibility of waste segregation

Response	Pre-Intervention		Post-Intervention	
	Nos.	Percent	Nos.	Percent
My responsibility	24	12	137	68.5
Panchayat/municipality's	146	73	26	13
Government's	21	10.5	7	3.5
Community's	9	4.5	30	15
Total	200	100	200	100
	$\chi^2_{(cal)}: 248.28; df: 3,$ $\chi^2_{(crit)}: 7.82; p<0.05$		$\chi^2_{(cal)}: 207.88; df: 3,$ $\chi^2_{(crit)}: 7.82; p<0.05$	

Above **Table 3** shows responses of the villagers about processing of non-recyclable materials. The data pertaining to same was collected before and after the intervention.

- **Pre-Intervention:** The data collected before the intervention showed that 12% villagers feel that waste segregation is their responsibility, while according to 73% villagers waste segregation is responsibility of panchayat/municipality. However according to 10.5% villagers it is governments responsibility and according to 4.5% villagers it is community's responsibility. The Chi-Square test results show that significantly high percentage of villagers of study area i.e. Bicholim and Sattari Talukas of Goa feel that waste segregation is responsibility of panchayat/municipality.

- **Post-Intervention:** The data collected after the intervention showed that 68.5% villagers feel that waste segregation is their responsibility, while according to 13% villagers waste segregation is responsibility of panchayat/municipality. However according to 3.5% villagers it is governments responsibility and according to 15% villagers it is community's responsibility. The Chi-Square test results show that significantly high percentage of villagers of study area i.e. Bicholim and Sattari Talukas of Goa feel that waste segregation is their own responsibility.

3.4 Willingness to segregate waste at home

Table 4: Opinion of the villagers about willingness to segregate waste at home

Response	Pre-Intervention		Post-Intervention	
	Nos.	Percent	Nos.	Percent
Yes, without condition	112	56	182	91
Yes, but only if I am getting some incentive	78	39	14	7
Not Sure	10	5	4	2
No	0	0	0	0
Total	200	100	200	100
	$\chi^2_{(cal)}: 174.56; df: 3,$ $\chi^2_{(crit)}: 7.82; p < 0.05$		$\chi^2_{(cal)}: 466.72; df: 3,$ $\chi^2_{(crit)}: 7.82; p < 0.05$	

Above **Table 4** shows responses of the villagers about willingness to segregate waste at home. The data pertaining to same was collected before and after the intervention.

- **Pre-Intervention:** The data collected before the intervention showed that 56% villagers are willing to segregate waste at home without any condition, while 39% villagers are willing to segregate waste at home only if they get any incentive and 5% respondents are not sure about segregation of waste at home. The Chi-Square test results show that high percentage of villagers of study area i.e. Bicholim and Sattari Talukas of Goa are willing to segregate waste at home without any condition.
- **Post-Intervention:** The data collected after the intervention showed that 91% villagers are willing to segregate waste at home without any condition, while 7% villagers are willing to segregate waste at home only if they get any incentive and 2% respondents are not sure about segregation of waste at home. The Chi-Square test results show that high percentage of villagers of study area i.e. Bicholim and Sattari Talukas of Goa are willing to segregate waste at home without any condition.

3.5 Awareness about value of waste

Table 5: Awareness about value of waste

Response	Pre-Intervention		Post-Intervention	
	Nos.	Percent	Nos.	Percent
Yes	98	49	189	94.5
No	102	51	11	5.5
Total	200	100	200	100
	$\chi^2_{(cal)}: 0.08; df: 1,$ $\chi^2_{(crit)}: 3.84; p < 0.05$		$\chi^2_{(cal)}: 158.42; df: 1,$ $\chi^2_{(crit)}: 3.84; p < 0.05$	

Above **Table 5** shows responses of the villagers regarding awareness about value of waste. The data pertaining to same was collected before and after the intervention.

- **Pre-Intervention:** The data collected before the intervention showed that 49% villagers are aware about value of waste, while 51% villagers are not aware about value of waste. The Chi-Square test results show that high percentage of villagers of

study area i.e. Bicholim and Sattari Talukas of Goa are not aware about value of waste.

- **Post-Intervention:** The data collected after the intervention showed that 94.5 villagers are aware about value of waste, while 5.5% villagers are not aware about value of waste. The Chi-Square test results show that high percentage of villagers of study area i.e. Bicholim and Sattari Talukas of Goa are aware about value of waste.

4.0 Conclusions

4.1 Outlook about the solid waste disposal

- From the study results it is evident that prior to pre and after the intervention significantly high percentage of villagers consider solid waste disposal as a real issue in their respective villages. Furthermore, the comparison of proportion of villagers indicating that solid waste disposal is a real issue showed that there is noticeable growth in the proportion of people considering the issue (of solid waste disposal) being real, as confirmed from the Z test of two proportions that showed value of z to be -3.1354. The value of p is .00168. The result is significant at $p < 0.05$. Hence, it can be concluded that the intervention had noticeable impact on the attitude of local people vis-à-vis issue of solid waste disposal in their villages.

4.2 Effect of Solid Waste on Health and Environment

- From the study results it is evident that prior to pre and after the intervention significantly high percentage of villagers feel that unmanaged solid waste affects health and environment. Furthermore, the comparison of proportion of villagers indicating that unmanaged solid waste affect health and environment showed that there is noticeable growth in the proportion of people considering that unmanaged solid waste affect health and environment, as confirmed from the Z test of two proportions that showed value of z to be -7.4808. The value of p is .00001. The result is significant at $p < 0.05$. Hence, it can be concluded that the intervention had noticeable impact on the attitude of local people vis-à-vis unmanaged solid waste affects health and environment.

4.3 Responsibility of waste segregation (dry-wet)

- From the study results it is evident that prior to pre and after the intervention high percentage of villagers feels that waste segregation is their responsibility. Furthermore, the comparison of proportion of villagers indicating responsibility of waste segregation showed that there is noticeable increase in the proportion of villagers feeling that waste segregation is their own responsibility as confirmed from the Z test of two proportions that showed value of z to be 0.9892. The value of p is .32218. The result is significant at $p < 0.05$. Hence, it can be concluded that the intervention had made noticeable impact on awareness of local people vis-à-vis segregation of dry and wet waste is their responsibility.

4.4 Willingness to segregate waste at home

- From the study results it is evident that prior to pre and after the intervention high percentages of villagers are willing to segregate waste at home without any condition. Furthermore, the comparison of proportion of villagers indicating willingness to segregation of waste at home showed that there is noticeable increase in the proportion of villagers willing to segregate waste at home as confirmed from the Z test of two proportions that showed value of z to be 2.2307. The value of p is .02574. The result is significant at $p < 0.05$. Hence, it can be concluded that the intervention had made noticeable impact on awareness of local people vis-à-vis willing to segregate waste at home for panchayat without any condition.

4.5 Awareness about value of waste

- From the study results it is evident that prior to pre and after the intervention high percentages of villagers are aware about value of waste. Furthermore, the comparison of proportion of villagers indicating awareness about value of waste showed that there is noticeable increase in the proportion of villagers indicating awareness about value of waste as confirmed from the Z test of two proportions that showed value of z to be -9.7699. The value of p is .00001. The result is significant at $p < 0.05$. Hence, it can be concluded that the intervention had made noticeable impact on awareness of local people vis-à-vis waste can be sold in market.

5.0 References

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