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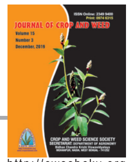

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Perceptual motivation of urban people in waste recycling: The dynamics of social ecology

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ABSTRACT

The social ecology of waste recycling implies the structural, functional and managerial intervention of waste generation process. The present study was conducted in Kalyani and Jalpaiguri municipalities of West Bengal. Twenty one (21) independent variables and one dependent variable i.e. motivation of waste recycling (Y_3) have been selected for the study. Total one fifty respondents, seventy five from each municipal area have been selected by systematic random sampling. In Jalpaiguri and Kalyani, few variables like impact of waste management on water, impact of waste management on soil and impact of waste management on agriculture have gone in the determinant way. But in both municipal areas perception of environmental impact of waste management have recorded equal contribution so it can be said that perception of environmental impact on waste management has come out as to be the most significant causal variables to characterize the entire episode of waste management process for both municipalities.

Keywords: Ecological services, social ecology, waste management, waste recycling, motivation in waste recycling

Waste is for the most part of an urban wonder, and is commonly an urban issue. Today, over half of the populace lives in the urban a world's areas and the pace of urbanization is expanding rapidly. The production of municipal solid waste represents one of the greatest challenges currently faced by waste managers all around the world (Alfaia *et al.*, 2017). Due to the increase in the world's population and most of it moving to urban cities, there is increased demand for food, and this has resulted in the production of large amounts of agricultural wastes, both at farmer, municipality and city levels (Sabiiti, 2011).Solid waste age is the side-effect of the urbanization. Waste is a great concern of urban life in every city of the world. Developed cities of world are using modern disposal and recycling technologies as well as state of the art equipments and ensuring their dwelling neat and tidy (Islam, 2012). Management of solid waste may be defined as the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics, and other environmental considerations. Solid waste generation is the by-product of the urbanization. It is highly related with economic growth, degree of industrialization and consumption pattern. With the increase of urban population of the cities and towns all other activities associated with population also increases resulting in more and more generation of municipal solid waste. And in the absence of technology and efficient and effective methods of disposing refuse worsen the quality of air of the urban centers which have detrimental impacts on human health. The world paper industry produces a great amount of industrial solid waste that undergoes a treatment process that can be primary, secondary, or tertiary, in order to adapt the waste for correct disposal (Azevedo *et al.*, 2019). The pulp and paper industry traditionally generates large amounts of wastes at different stages of its production process, such as primary sludge that is extremely wet (Azevedo *et al.*, 2020). Electronic waste or E-waste is one of the main sources of harmful toxic pollutants (polyvinyl chlorides, polychlorinated biphenyls, lead and mercury). E-waste also represents a potent source of valuable metals such as gold, silver, palladium, and copper (Irani *et al.*, 2016). Due to the growing concerns about the increasing release of consumer products to the environment, especially for defective electronic products, the management of the closed-loop supply chain (CLSC) is emerging. To do this, a chain consisting of a manufacturer, a retailer, and a collector is offered in a manufacturer-led Stackelberg game (Rezayat *et al.*, 2020). Civil construction is responsible for the excessive consumption of natural resources and the generation of the largest share of solid urban waste (Calcado *et al.*, 2019). Environmental contamination due to solid waste mismanagement is a global issue. Open dumping and open burning are the main implemented waste treatment and final disposal systems, mainly visible in low-income countries (Ferronato and Torretta, 2019).

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Wastes are the by-product of a process called "Modernization and Urbanization" with the generation of urban amenities and livelihood. Municipal solid waste management (MSWM) is an important environmental challenge and subject in urban planning (Jen *et al.*, 2012). The ecological impact of waste recycling certainty implies the structural, functional and managerial nature and intervention of the waste generation process. Population growth associated with population migration to urban areas and industrial developments have led to consumption relations that result in environmental, social, and economic problems. With respect to the environment, a critical concern is the lack of control and the inadequate management of the solid waste generated in urban centers (Melare *et al.*, 2017). The challenges are proper waste-collection management, treatment, and disposal, with an emphasis on sustainable management. Every year in India we are producing 133760 tons of wastes comprising of both bio degradable and non bio degradable materials. Out of this total waste generation 91,152 tons of wastes are collected and 25,884 tons of wastes are treated for different purposes. Medical bio wastes drifted by hospitals and private nursing homes are also a serious concern. Medical care is vital for our life, health and wellbeing. But the waste generated from medical activities can be hazardous, toxic and even lethal because of their high potential for diseases transmission. The hazardous and toxic parts of waste from healthcare establishments comprising infectious, medical and radioactive material, constitute a grave risks to mankind and the environment, if these are not properly treated / disposed or are allowed to be mixed with other municipal waste (Babanyara *et al.*, 2013). Composting of organic waste is a possible solution to the long-standing rubbish problem, limiting the amount of waste going to final disposal. Fertilization with composted waste could have positive agronomic and environmental effects if the doses are balanced against the nitrogen requirements of crops (Fragnano *et al.*, 2011). When wastes are properly recycled treated and managed it can add values and resources but incase it is not properly managed it contributes to pernicious pollution. The bio wastes and residues from agriculture field a well are transformed into bio resources in the form of organic manure and different bio products, available and amenable to mobilize sustainable agriculture. Not only agricultural waste fish waste can also be used in organic farming. The production and uses of fertilizers from fish and Fish Waste (FW) can be applicable for certified organic farming, with a focus on crop and horticultural plants. Fish industries generate a substantial amount of fish waste. Depending on the level of processing or type of fish, 30-70% of the original fish is fish waste. Circular economy and organic farming concepts were used to evaluate the potential of production of fertilizers from captured fish. Fertilizers produced from captured fish promote the recycling of nutrients from the sea and back to terrestrial environments (Ahuja *et al.*, 2020). A typical waste management system comprises collection, transportation, pre-treatment, processing, and final settlement of residues. The waste management system consists of the whole set of activities related to handling, treating, disposing or recycling the waste materials (Demirbas, 2011).

Kalyani Civil territory, having 21 wards, was chosen for the investigation. In Kalyani town wastes the executives is a difficult issue and carefully need legislative concern. In kalyani civil territory around 52Mt wastes produces every day. This town has 9 vegetable markets and 8 fish markets. Roughly 6-8Mt of wastes produces structure vegetable markets and around 1Mt of wastes create structure fish showcase. Out of all out waste age, household wastes contribute 75%, wellbeing units contribute 2%, Markets contribute 10%, office and foundations contribute 3%, modern wastes contribute 2% and street clearing contributes 8% wastes and 60% of absolute wastes are bio degradable in nature. Kalyani district has acquainted a framework with collected solid waste from singular premises in two separate holders, bio degradable wastes in green dustbin and non bio degradable waste in yellow dust bin. Collection of wastes is done through house to house collection and network canister collection. After collection, waste is moved to dumping ground. From collection to disposal to the damping ground the whole procedure confronts difficult issues. Unhygienic open dumping is pervasive in dumping ground that dirties the ecosystem. Jalpaiguri Municipality area having 25 wards were selected for the study. In Jalpaiguri town waste management is a serious problem and strictly need governmental concern. In West Bengal approximately total 12552 MT of wastes are left per day. In jalpaiguri town approximately 52520 kg wastes produced every day. Out of total waste generation, 29490 kg wastes are bio degradable in nature and 23020 kg of waste are non biodegradable in nature. The solid waste management system for Jalpaiguri municipality has been prepared for improvement of the present solid waste management system of the town. Project has been developed and requires 12.2 acres of land. Jalpaiguri municipality already has 14 acres of land for this purpose. At present solid waste management programmer is going through ward committee of different wards with direct supervision of the sanitary department of jalpaiguri municipality. This scheme has been implemented in 16 wards. Jalpaiguri municipality has introduced a system to collect accumulated solid waste from individual premises in two separate containers i.e. bio degradable wastes in green container and non bio degradable waste in yellow container. Collection of waste is done through house to house collection and community bin collection. After collection, waste is transferred to dumping ground. The function of entire system has been facing various problems such as non approval of vermi composting project, require number of vehicles, implements *etc*.

Municipalities have been facing problems to keep the management of their Municipal Solid Waste (MSW) in financial balance. Increasing public awareness, stricter legislation and large generation of MSW have led to high costs concerning related services (Alzamora, 2020). Both Jalpaiguri and Kalyani municipal areas have great ecological diversity. Jalpaiguri which is situated at the northern part of West Bengal, India is surrounded by beautiful hills, forests and rivers and Kalyani which is situated at southern part of West Bengal, India, is a very beautiful planned city, which is surrounded by lakes, trees and have diversified ecosystem. Both municipalities are trying to keep the cities clean. But the function of entire system has been facing various problems such as non approval of vermi composting project, require number of vehicles, implements etc. Unhygienic open dumping is also prevalent in both towns. Medicinal wastes require recycling facility. Recycling facility, incineration facility is not available in towns. Adequate fund is also required to run the solid waste management programmer under both Kalyani and Jalpaiguri Municipality as the system is a continuous process. Presently Jalpaiguri municipal authority has decided to engage private agency, NGO, and institution as recognized by the government to run the project of solid waste management because a sound waste management guarantees better stewardship for guaranteeing bio security and natural wellbeing and knowledge of waste recycling will reduce improper waste disposal and save the environment and ecological diversity of these towns. In this way, with the end goal of the investigation, a model has been developed for reasonable waste management so biological expectations can be followed out dovetailed to the working financial capacities.

The specific objective of the research was to isolate and identify the system variables characterizing and the management of waste recycling process and to estimate intra and inter level of interaction amongst and between the variables for respective, inductive and interactive contribution.

RESEARCH METHODOLOGY

The present study was conducted in two districts namely Jalpaiguri district and Nadia district. In Jalpaiguri district, Jalpaiguri Municipal area and in Nadia district Kalyani Municipal area were selected for the study. The area had been selected for the study because of there is a large scope for collecting relevant data for the present study, acquaintance with the local people as well as local language, The closure familiarities of the researcher with area, people, officials and local dialects.

The state, district, sub divisions were selected using non-probability sampling technique called purposive sampling and the respondents were selected using simple random sampling method. The two municipalities were selected purposively. Out of two municipalities total 150 respondents were selected, 75 respondents from each municipality from five respective locations (Vegetable market, Fish market, Hospital area, Railway stations, Ward area) were selected randomly for final data collection. The twenty one variables were selected as independent variables and four variables were considered as the dependent variables for the present study. The data were collected with the help of pretested structured interview schedule through personal interview method. The data were processed into the statistical tools like Correlation, Multiple regression, Step down regression and Path analysis.

RESULTS AND DISCUSSION

Coefficient of correlation (r): motivation of Waste recycling (y_3) vs. 21 independent variables (x_1-x_{21}) (Kalyani municipal area)

Table-1 presents the coefficient of correlation between motivation of waste recycling (y_3) and 21 independent variables(x_1-x_{21}). The variables education(x_2), total cost of energy(x_4), income(x_6), expenditure of family(x_7), water consumption per day(x_9), impact of waste management on health(x_{11}), impact of waste management on agriculture(x_{12}), impact of waste management on water(x_{14}), perception on environmental impact of waste management(x_{20}), have gone positively to motivate people of waste recycling. Similarly the change in the following variables, household land(x_5), total bio diversity(x_{10}), participation on waste recycling programmer (x_{19}) , waste management at household level with value addition by percentage (x_{21a}), have got a negative impact on motivation of waste recycling. High education level on an average Kalyani citizen and its unique pro ecological values in the mind sets of the citizens have invited the scope for better waste management. Higher education leads to greater knowledge about different waste recycling processes. Kalyani has been found to have a traditional environmental consciousness and response to ecological services. As a high education level they are well aware about the impact of waste management

Table 1: Coefficient of correlation (r): motivation of waste recycling (y_3) vs. 21 independent variables (x_1-x_{21}) (Kalyani municipal area)

Independent variables	'r' Value	Remarks
Age(x_1)	.083	
Education(x_2)	.353	**
Family member(x_3)	-.065	
Total cost of energy(x_4)	.390	**
Household land(x_5)	-.345	**
Income(x_6) .419	**	
Expenditure of family(x_7)	.305	**
Volume of waste generation per household(x_8)	-.179	
Water consumption per day(x_9)	.285	*
Total bio diversity(x_{10})	-.283	*
Impact of waste management on health(x_{11})	.365	**
Impact of waste management on agriculture(x_{12})	.340	**
Impact of waste management on livestock(x_{13})	-.021	
Impact of waste management on water(x_{14})	.468	**
Impact of waste management on soil(x_{15})	.004	
Impact of waste management on micro flora and fauna(x_{16})	-.155	
Exposure to media(x_{17})	.041	
Training received(x_{18})	-.069	
Participation on waste recycling programmer (x_{19})	-.251	*
Perception on environmental impact of waste management(x_{20})	.505	**
Waste management at household level with value addition by percentage (x_{21a})	-.236	*
Waste management at household level with value addition by percentage (x_{21b})	-.110	

*** Correlation is significant at the 0.01 level*Correlation is significant at the 0.05 level*

Table 2: Multiple Regression Analysis: motivation of waste recycling (y_3) Vs. 21independent variables (x_1-x_{21}) (Kalyani municipal area)

Sl. No	Variables	Reg.Coef. B	S.E. B	Beta	t Value
1	Age (x_1)	.019	.021	.118	.888
2	Education(x_2)	-.045	.055	-.238	-.807
3	Family member(x_3)	.440	.231	.456	1.908
4	Cost of energy per month (x_4)	.007	.002	1.081	2.963
5	Household land (x_5)	-3.435	2.104	-.457	-1.632
6	Income (x_6)	1.684	.000	.132	.334
7	Expenditure (x_7)	.000	.000	-.319	-1.072
8	Volume of waste generation from household (x_8)	-.002	.001	-.431	-1.654
9	Water consumption per day (x_9)	-.037	.043	-.150	-.870
10	Total bio diversity (x_{10})	.004	.002	.901	1.976
11	Impact of waste management on Health (x_{11})	.074	.095	.098	.786
12	Impact of waste management on Agriculture (x_{12})	.096	.092	.119	1.042
13	Impact of waste management on Livestock(x_{13})	.011	.117	.012	.097
14	Impact of waste management on Water(x_{14})	.092	.071	.169	1.299
15	Impact of waste management on Soil(x_{15})	.069	.093	.095	.744
16	Impact of waste management on Micro flora and fauna(x_{16})	-.084	.125	-.108	-.669
17	Exposure to Media(x_{17})	-.238	.145	-.201	-1.647
18	Training received(x_{18})	.032	.103	.037	.308
19	Participation on waste recycling programmer (x_{19})	-.160	.153	-.160	-1.047
20	Perception on environmental impact of waste management(x_{20})	.254	.124	.278	2.056
21	Waste management at household level with value addition by percentage (x_{21a})	-.002	.004	-.059	-.468
22	Waste management at household level with value addition by percentage (x_{21b})	.004	.010	.062	.408

R square: 56.20 per cent
The standard error of the estimate 71.05 per cent

Table 3: Stepwise regression analysis: motivation of waste recycling (y_3) vs. 21 independent variables (Kalyani municipal area)

Sl.No	Variables	Reg.coef.B	S.E. B	Beta	t value
1	Impact of waste management on Water(x_{14})	.173	.057	.319	3.061
2	Perception on environmental impact of waste management(x_{20})	.347	.095	.379	3.645

R square: 34 per cent
The standard error of the estimate 74.12 per cent

Table 4: Path analysis: decomposition of total effect into direct, indirect and residual effect: motivation of waste recycling (y_3) vs. consequent variables(x_1-x_{21}) (Kalyani municipal area)

Sl. No	Variables	Total Effect	Direct Effect	Indirect Effect	Highest Indirect Effect
1	Age (x_1)	0.083	0.112	-0.029	0.202(x_3)
2	Education(x_2)	0.353	-0.253	0.660	0.833(x_4)
3	Family member(x_3)	-0.065	0.449	-0.514	0.252(x_8)
4	Cost of energy per month (x_4)	0.390	1.071	-0.681	0.131(x_6)
5	Household land (x_5)	-0.345	-0.455	0.110	0.713(x_{10})
6	Income (x_6)	0.419	0.160	0.259	0.880(x_4)
7	Expenditure (x_7)	0.305	-0.329	0.634	0.936(x_4)
8	Volume of waste generation from household (x_8)	-0.179	-0.433	0.254	0.681(x_{10})
9	Water consumption per day (x_9)	0.285	-0.150	0.435	0.709(x_4)
10	Total bio diversity (x_{10})	-0.283	0.894	-1.177	0.153(x_2)
11	Impact of waste management on Health (x_{11})	0.365	0.099	0.266	0.332(x_4)
12	Impact of waste management on Agriculture (x_{12})	0.340	0.119	0.221	0.208(x_4)
13	Impact of waste management on Livestock(x_{13})	-0.021	0.011	-0.032	0.073(x_{10})
14	Impact of waste management on Water(x_{14})	0.468	0.169	0.299	0.340(x_4)
15	Impact of waste management on Soil(x_{15})	0.004	0.094	-0.040	0.033(x_8)
16	Impact of waste management on Micro flora and fauna(x_{16})	-0.155	-0.106	-0.049	0.054(x_{15})
17	Exposure to Media(x_{17})	0.041	-0.201	0.242	0.354(x_4)
18	Training received(x_{18})	-0.069	0.037	-0.106	0.095(x_3)
19	Participation on waste recycling(x_{19})	-0.251	-0.158	-0.093	0.245(x_3)
20	Perception on environmental impact of waste management(x_{20})	0.505	0.278	0.227	0.449(x_4)
21	Waste management at household level with value addition by percentage (x_{21a})	-0.236	-0.060	-0.176	0.061(x_7)
22	Waste management at household level with value addition by percentage (x_{21b})	-0.110	0.061	-0.171	0.408(x_{10})

Residual effect: 43.75 per cent

on health, soil, livestock and micro flora and fauna. So, these variables are directly correlated with knowledge of waste recycling.

Multiple Regression Analysis: motivation of waste recycling (y_3) Vs. 21independent Variables (x_1-x_{21}) (Kalyani municipal area)

Table-2 offers us the multiple regression analysis with full model to see what are the significant causal variables functionally impact on consequent variables. The R^2 value 56.20 per cent, it is to conclude that with the combination of 21 variables 56.20 per cent of variance in the analysis has been explained.

Stepwise Regression Analysis: motivation of waste recycling (y_3) vs. 21 independent variables(Kalyani municipal area)

The Stepwise regression analysis suggests that two variables retained in the last step and has contributed 34 per cent of the total variance explained. Here, these two variables have explained approximately 60.49 per cent of the total variance explained. Improper waste management leads to contamination of water bodies. The better perception on waste management and its impact on environmental health have got significant functional consequences.

Table 5: Coefficient of Correlation (r): motivation of waste recycling (y_3) vs. 21independent variables (x_1-x_{21}) (Jalpaiguri municipal area)

Independent Variables	'r' Value	Remarks
Age(x_1)	-.174	
Education(x_2)	.110	
Family member(x_3)	-.088	
Total cost of energy(x_4)	.206	
Household land(x_5)	-.151	
Income(x_6)	.180	
Expenditure of family(x_7)	.241	*
Volume of waste generation per household(x_8)	.076	
Water consumption per day(x_9)	.308	**
Total bio diversity(x_{10})	-.167	
Impact of waste management on health(x_{11})	.259	*
Impact of waste management on agriculture(x_{12})	.214	
Impact of waste management on livestock(x_{13})	.152	
Impact of waste management on water(x_{14})	.032	
Impact of waste management on soil(x_{15})	-.207	
Impact of waste management on micro flora and fauna(x_{16})	.124	
Exposure to media(x_{17})	.258	*
Training received(x_{18})	-.158	
Participation on waste recycling programmer (x_{19})	-.050	
Perception on environmental impact of waste management(x_{20})	.520	**
Waste management at household level with value addition by percentage (x_{21a})	-.016	
Waste management at household level with value addition by percentage (x_{21b})	.036	

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Table 6: Multiple Regression Analysis: motivation of waste recycling (y_3) Vs. 21independent variables (x_1-x_{21}) (Jalpaiguri municipal area)

Sl. No	Variables	Reg. Coef. B	S.E. B	Beta	t Value
1	Age (x_1)	-.005	.013	-.066	-.366
2	Education(x_2)	-.018	.052	-.082	-.350
3	Family member(x_3)	.183	.240	.241	.761
4	Cost of energy per month (x_4)	.001	.001	.119	.766
5	Household land (x_5)	.256	1.658	.048	.154
6	Income (x_6)	1.972	.000	.134	.474
7	Expenditure (x_7)	9.851	.000	.209	.758
8	Volume of waste generation from household (x_8)	.000	.000	-.084	-.585
9	Water consumption per day (x_9)	.006	.025	.045	.242
10	Total bio diversity (x_{10})	5.336	.001	.014	.049
11	Impact of waste management on Health (x_{11})	.036	.084	.057	.423
12	Impact of waste management on Agriculture (x_{12})	.196	.101	.271	1.945
13	Impact of waste management on Livestock(x_{13})	-.006	.086	-.011	-.075
14	Impact of waste management on Water(x_{14})	-.034	.089	-.053	-.382
15	Impact of waste management on Soil(x_{15})	-.112	.102	-.147	-1.099
16	Impact of waste management on Micro flora and fauna(x_{16})	.037	.101	.055	.363
17	Exposure to Media(x_{17})	.104	.154	.093	.679
18	Training received(x_{18})	-.070	.084	-.108	-.831
19	Participation on waste recycling programmer (x_{19})	-.044	.130	-.068	-.337
20	Perception on environmental impact of waste management(x_{20})	.446	.162	.450	2.753
21	Waste management at household level with value addition by percentage (x_{21a})	.004	.003	.210	1.263
22	Waste management at household level with value addition by percentage (x_{21b})	-.004	.004	-.109	-.861

R square: 45.60 per cent
The standard error of the estimate 66.92 per cent

Table 7: Stepwise Regression Analysis: motivation of waste recycling (y_3) Vs. 21independent variables (Jalpaiguri municipal area)

Sl.No	Variables	Reg.coef.B	S.E. B	Beta	t value
1	Impact of waste management on Agriculture (x_{12})	.169	.069	.234	2.460
2	Impact of waste management on Soil(x_{15})	-.153	.072	-.201	-2.114
3	Perception on environmental impact of waste management(x_{20})	.511	.094	.516	5.428

R square: 36 per cent
The standard error of the estimate 62.14 per cent

Table 8: Path Analysis: decomposition of total effect into direct, indirect and residual effect: motivation of waste recycling (y_3) vs. consequent variables(x_1-x_{21}) (Jalpaiguri municipal area)

Sl. No	Variables	Total effect	Direct effect	Indirect effect	Highest indirect effect
1	Age (x_1)	-0.174	-0.066	-0.108	0.147(x_3)
2	Education(x_2)	0.110	-0.084	0.194	0.162(x_7)
3	Family member(x_3)	-0.088	0.239	-0.327	0.065(x_{21a})
4	Cost of energy per month (x_4)	0.206	0.120	0.086	0.107(x_7)
5	Household land (x_5)	-0.151	0.044	-0.195	0.113(x_3)
6	Income (x_6)	0.180	0.137	0.043	0.176(x_7)
7	Expenditure (x_7)	0.241	0.208	0.033	0.146(x_{20})
8	Volume of waste generation from household (x_8)	0.076	-0.084	0.160	0.093(x_{20})
9	Water consumption per day (x_9)	0.308	0.043	0.265	0.096(x_7)
10	Total bio diversity (x_{10})	-0.167	0.017	-0.184	0.080(x_{21a})
11	Impact of waste management on Health (x_{11})	0.259	0.056	0.203	0.097(x_{20})
12	Impact of waste management on Agriculture (x_{12})	0.214	0.270	-0.056	0.040(x_3)
13	Impact of waste management on Livestock(x_{13})	0.152	-0.009	0.161	0.115(x_{20})
14	Impact of waste management on Water(x_{14})	0.032	-0.053	0.085	0.066(x_{12})
15	Impact of waste management on Soil(x_{15})	-0.207	-0.148	-0.059	0.020(x_{21a})
16	Impact of waste management on Micro flora and fauna(x_{16})	0.124	0.056	0.068	0.152(x_{20})
17	Exposure to Media(x_{17})	0.258	0.093	0.165	0.149(x_{20})
18	Training received(x_{18})	-0.158	-0.109	-0.049	0.036(x_7)
19	Participation on waste recycling(x_{19})	-0.050	-0.065	0.015	0.177(x_3)
20	Perception on environmental impact of waste management(x_{20})	0.520	0.449	0.071	0.067(x_7)
21	Waste management at household level with value addition by percentage (x_{21a})	-0.016	0.211	-0.227	0.074(x_3)
22	Waste management at household level with value addition by percentage (x_{21b})	0.036	-0.108	0.144	0.118(x_{20})

Residual effect: 54.37 per cent

Path Analysis: decomposition of total effect into direct, indirect and residual effect: motivation of waste recycling (y_3) vs. consequent variables(x_1-x_{21}) (Kalyani municipal area)

In the Table 4 the path analysis decomposes the total effect into direct, indirect and residual effect of motivation of waste recycling (y_3) vs. 21 exogenous variables. The variable perception on environmental impact of waste management(x_{20}) exerts the highest total effect(r), and the variable, total cost of energy per month(x_4) records the highest direct effect and the variable education(x_2) exerts the highest indirect effect on motivation of waste recycling (y_3). The variable total cost of energy per month(x_4) has enrooted highest indirect effect through as many as nine exogenous variables. The path analysis depicts that 43.75 per cent variance of knowledge of waste recycling (y_3) cannot be explained.

Coefficient of Correlation (r): motivation of waste recycling (y_3) vs. 21independent variables (x_1-x_{21}) (Jalpaiguri municipal area)

Table 5 presents the coefficient of correlation between motivation of waste recycling (y_3) and 21 independent variables(x_1-x_{21}). The variables expenditure of family(x_7),water consumption per day(x_9),impact of waste management on health(x_{11}), exposure to media(x_{17}), perception on environmental impact of waste management(x_{20}) have gone positively to influence motivation of waste recycling. Improper waste management can damage our health and motivation of waste recycling will reduce improper waste disposal and improve our health and ecology. Improper waste management leads to ecological damage and motivation of waste recycling will reduce improper waste disposal and save our environment and ecology.

Multiple Regression Analysis: motivation of waste recycling (y_3) Vs. 21independent variables (x_1-x_{21}) (Jalpaiguri municipal area)

Table 6 offers us the multiple regression analysis with full model to see what is the significant causal variables functionally impact on consequent variables. The R^2 value being 45.60 per cent, it is to conclude that with the contribution of 21 variables 45.60 per cent of variance in the analysis has been explained.

Stepwise Regression Analysis: motivation of waste recycling (y_3) vs. 21independent variables (Jalpaiguri municipal area)

The Stepwise regression analysis suggests that three variables retained in the last step; and have contributed 36 per cent of the total variance explained. Here, these three variables have explained approximately 78.94 percent of the total variance explained. The revelation suggests that improper waste management has been found to have decisive impact on soil. The better perception on waste management on agriculture and its impact on environmental health has found significant functional impact on motivation of waste recycling.

Path Analysis: decomposition of total effect into direct, indirect and residual effect: motivation of waste recycling (y_3) vs. consequent variables(x_1-x_{21}) (Jalpaiguri municipal area)

In the Table 8 the path analysis decomposes the total effect into direct, indirect and residual effect of motivation of waste recycling (y_3) vs. 21 exogenous variables. The variable perception on environmental impact of waste management(x_{20}) exerts the highest total effect and records the highest direct effect and the variable water consumption per day (x_9) exerts the highest indirect effect on motivation of waste recycling (y_3). The variable perception on environmental impact of waste management(x_{20}) has enrooted highest indirect effect through as many as seven exogenous variables. The path analysis depicts that 54.37 per cent variance of knowledge of waste recycling (y_3) cannot be explained.

CONCLUSION

Throughout the entire study it has been observed that in terms of variable behavior and responses there have been stark differences between Jalpaiguri and Kalyani. In Kalyani some few variables like impact of waste management and recycling on water have recorded the distinct contribution. Kalyani has been found to have a traditional environmental consciousness and response to ecological services. This variable has come out strong determinant in characterizing the consequent variable motivation of waste recycling. For Jalpaiguri, impact of waste management on soil and agriculture has gone in the determinant way. But in both municipal areas perception of environmental impact of waste management have recorded equal contribution. So it can be said that improper waste management leads to ecological damage and motivation of waste recycling will reduce improper waste disposal and save our environment and ecology.

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