A. Appendix

Table A.1. Numbered communities of Betania to be used along this paper as Community ID indexes

1	Betania	12	Club X	23	Villa Soberanía
2	El Ingenio	13	Linda Vista	24	Altos De Miraflores
3	La Gloria	14	Miraflores	25	Altos Del Chase
4	La Loceria	15	Nuevo Paraíso	26	Colinas De Miraflores
5	Los Libertadores	16	Pribanco	27	Dos Mares
6	Santa Maria	17	Residencial Sara Sotillo	28	El Dorado
7	Villa Cáceres	18	San Antonio	29	El Milagro
8	Condado Del Rey	19	San José	30	La Alameda
9	Corona Gardens	20	Urbanización Colonial	31	Los Angeles
10	Alto De Betania	21	Urbanización Industrial	32	Villa De Las Fuentes
11	Altos De Correza	22	Urbanización Las Mercedes	33	Villa De Las Fuentes No.2

Table A.2. Acronyms, statistical results and coefficient values for the variables used in **Equations 1 to 8**. Variables names referring to individual *(ind)*, household *(hh),* community *(com)*, observed *(obs)*, available *(ava)*, calculated *(cal)*, estimated *(est),* regressed *(reg).*

$\boldsymbol{diag(Wind_{44})_{hh-est}}$	*4x4* size diagonal matrix describing the MSW generation per individual and day, estimated from the observed — i.e. measured — median MSW generation values per household per day of the 4 communities for which they belong to $\boldsymbol{diag(Whh_{44})_{hh-obs}}$ divided by the observed — i.e. surveyed — total individuals living in each household $(\boldsymbol{diag(Pind_{44})_{hh-obs}}.)$
$\boldsymbol{diag(Whh_{44})_{hh-obs}}$	*4x4* size diagonal matrix representing the observed — i.e. measured — median MSW generation values per household per day for 600 households in 4 communities of Betania, 150 per community.
$\boldsymbol{diag(Pind_{44})_{hh-obs}}$	*4x4* size diagonal matrix representing the observed — i.e. surveyed — total individuals per household in the 4 sampled communities of the town of Betania.
$\boldsymbol{diag(Ihh_{44})_{hh-ava}}$	*4x4* size diagonal matrix representing the *"Household median monthly income"* officially available data for

	the 4 communities sampled in the town of Betania.
$\boldsymbol{diag(Wind_{ii})_{hh-reg}}$	*ii* size diagonal matrix representing the MSW generation values per individual and day of the linear regression model obtained with $\boldsymbol{diag(Wind_{44})_{hh-est}}$ as dependent variable and $\boldsymbol{diag(Ihh_{ii})_{44-ava}}$ as independent variable for the *i* communities of the town to which households belong.
$\boldsymbol{(\beta_o J_{ii})_{hh}}$	*ii* size diagonal matrix for the intercept value of the linear regression model obtained for $\boldsymbol{diag(Wind_{ii})_{hh-reg}}$ *p-value: 0.62, std. error: 1.63e-01.*
$\boldsymbol{(\beta_1)_{hh}}$	Scalar coefficient for the independent variable $\boldsymbol{diag(Ihh_{ii})_{hh-ava}}$ of the linear regression model obtained for $\boldsymbol{diag(Wind_{ii})_{hh-reg}}$. *p-value: 0.07, std. error: 5.15e-05, confidence interval: (-4.33e-05, 4.00e-05).*
$\boldsymbol{diag(Ihh_{ii})_{hh-ava}}$	*ii* size diagonal matrix representing the variable *"Household median monthly income"* for the *i* communities of the town to which households belong. *r (effect size): 0.93, Min.: 2.60e03, 1st Qu.: 2.81e03 ,*

	Median: 3.15e03, Mean: 3.14e03, 3rd Qu.: 3.47e03 , Max.: 3.66e03.
$\boldsymbol{diag(Wind_{133})_{hh-cal}}$	*1x33* size diagonal matrix representing the MSW generation values per individual and day for the 33 communities that make up the town of Betania, calculated from $\boldsymbol{diag(Wind_{ii})_{hh-reg}}$ **.**
$\boldsymbol{diag(Pind_{133})_{hh-ava}}$	*1x33* size diagonal matrix representing the total individuals living in each household for the 33 communities that make up the town of Betania.
$\boldsymbol{diag(Whh_{133})_{ind-cal}}$	*1x33* size diagonal matrix representing the MSW generation values per household and day for the 33 communities that make up the town of Betania, calculated from the aggregation of $\boldsymbol{diag(Wind_{133})_{hh-cal}}$ by $\boldsymbol{diag(Pind_{133})_{hh-ava}}$**.**
$\boldsymbol{diag(IND_{133})_{com-ava}}$	*1x33* size diagonal matrix representing the variable *"Community indigenous population"* for the 33 communities that make up the town of Betania. *r (effect size): -0.46, Min.: 0.00, 1st Qu.: 2.60, Median: 14.36, Mean: 18.97, 3rd Qu.: 23.35, Max.: 65.07.*

$\boldsymbol{diag(Icom_{133})_{com-ava}}$	*1x33* size diagonal matrix representing the variable *"Community median monthly income of active population"* for the 33 communities that make up the town of Betania. *r (effect size): -0.12, Min.: 1.25e05, 1st Qu.: 7.18e05 , Median: 2.41e06, Mean: 3.06e06, 3rd Qu.: 5.66e06, Max.: 7.95e06*
$\boldsymbol{diag(NOSS_{133})_{com-ava}}$	*1x33* size diagonal matrix representing the variable *"Community population without social security"* for the 33 communities that make up the town of Betania. *r (effect size): -0.31, Min.: 12.96, 1st Qu.: 59.64 , Median: 260.43, Mean: 423.23, 3rd Qu.: 701.19, Max.: 1411.12*
$\boldsymbol{diag(LTG_{133})_{com-ava}}$	*1x33* size diagonal matrix representing the variable *"Community population with less than 3rd grade of primary school approved"* for the 33 communities that make up the town of Betania. *r (effect size): -0.34, Min.: 0.000, 1st Qu.: 3.89 , Median: 14.26, Mean: 23.49, 3rd Qu.: 33.70, Max.: 102.38*

$\boldsymbol{diag(ILL_{133})_{com-ava}}$	*1x33* size diagonal matrix representing the variable *"Community illiterate population"* for the 33 communities that make up the town of Betania. r (effect size): -0.36, Min.: 0, 1st Qu.: 1.30, Median: 6.48, Mean: 10.13, 3rd Qu.: 16.85, Max.: 44.06
$\boldsymbol{diag(Whh_{ii})_{com-reg}}$	*ii* size diagonal matrix representing the MSW generation values per household and day of the linear regression model obtained with $\boldsymbol{diag(Whh_{133})_{ind-cal}}$ as dependent variable and $\boldsymbol{diag(IND_{133})_{com-ava}}$ $\boldsymbol{diag(Icom_{133})_{com-ava}}$, $\boldsymbol{diag(NOSS_{133})_{com-ava}}$, $\boldsymbol{diag(LTG_{133})_{com-ava}}$ and $\boldsymbol{diag(ILL_{133})_{com-ava}}$ as independent variable for the *i* communities of the town to which households belong.
$\boldsymbol{diag(IND_{ii})_{com-ava}}$	*ii* size diagonal matrix representing the formalization of the variable *"Community indigenous population"* for the community where the MSW generating households are located.
$\boldsymbol{diag(Icom_{ii})_{com-ava}}$	*ii* size diagonal matrix representing the formalization of the variable *"Community median monthly income of*

	active population" for the community where the MSW generating households are located.
$\boldsymbol{diag(NOSS_{ii})_{com-ava}}$	*ii* size diagonal matrix representing the formalization of the variable *"Community population without social security"* for the community where the MSW generating households are located.
$\boldsymbol{diag(LTG_{ii})_{com-ava}}$	*ii* size diagonal matrix representing the formalization of the variable *"Community population with less than 3rd grade of primary school approved"* for the community where the MSW generating households are located.
$\boldsymbol{diag(ILL_{ii})_{com-ava}}$	*ii* size diagonal matrix representing the formalization of the variable *"Community illiterate population"* for the community where the MSW generating households are located.
$\boldsymbol{(\beta_o J_{ii})_{com}}$	*ii* size intercept value diagonal matrix of the linear regression model obtained for $\boldsymbol{diag(Whh_{ii})_{com-reg}}$. *p-value: 3.50e-13, std. error: 1.39e-01, confidence interval: (1.53, 2.11)*
$\boldsymbol{(\beta_1)_{com}}$	Scalar coefficient for the independent variable

	$\boldsymbol{diag(IND_{ii})_{com-ava}}$ of the linear regression model obtained for $\boldsymbol{diag(Whh_{ii})_{com-reg}}$. *p-value: 0.003 , std. error: 7.88e-03, confidence interval: (-4.16e-02, -9.31e-03), VIF´S = 2.93*
$(\boldsymbol{\beta_2})_{com}$	Scalar coefficient for the independent variable $\boldsymbol{diag(Icom_{ii})_{com-ava}}$ of the linear regression model obtained for $\boldsymbol{diag(Whh_{ii})_{com-reg}}$. *p-value: 6.43e-5, std. error: 1.09e-07, confidence interval: (2.91e-07, 7.38e-07), VIF´S = 10.80*
$(\boldsymbol{\beta_3})_{com}$	Scalar coefficient for the independent variable $\boldsymbol{diag(NOSS_{ii})_{com-ava}}$ of the linear regression model obtained for $\boldsymbol{diag(Whh_{ii})_{com-reg}}$. *p-value: 0.0006, std. error: 9.62e-04, confidence interval: (-5.69e-03, -1.74e-03), VIF´S = 21.13*
$(\boldsymbol{\beta_4})_{com}$	Scalar coefficient for the independent variable $\boldsymbol{diag(LTG_{ii})_{com-ava}}$ of the linear regression model obtained for $\boldsymbol{diag(Whh_{ii})_{com-reg}}$. *p-value: 0.006, std. error: 1.99e-02, confidence interval: (1.87e-02, 1.01e-01), VIF´S = 34.16*
$(\boldsymbol{\beta_5})_{com}$	Scalar coefficient for the independent variable

	$\boldsymbol{diag(ILL_{ii})_{com-ava}}$ of the linear regression model obtained for $\boldsymbol{diag(Whh_{ii})_{com-reg}}$. *p-value: 0.025, std. error: 3.98e-02, confidence interval: (-1.76e-01, -1.31e-02), VIF´S = 25.64*
$\boldsymbol{diag(Whh_{133})_{com-cal}}$	*1x33* size diagonal matrix representing the MSW generation values per household and day for the 33 communities that make up the town of Betania, calculated from $\boldsymbol{diag(Whh_{ii})_{com-reg}}$.
$\boldsymbol{diag(Phh_{133})_{com-ava}}$	*1x33* size diagonal matrix representing the total households located in each of the 33 communities of the town of Betania.
$\boldsymbol{diag(Wcom_{133})_{hh-cal}}$	*1x33* size diagonal matrix representing the MSW generation values per community and day for the 33 communities that make up the town of Betania, calculated from the aggregation of $\boldsymbol{diag(Whh_{133})_{com-cal}}$ by $\boldsymbol{diag(Phh_{133})_{com-ava}}$.
$\boldsymbol{(Wtown)_{hh-cal}}$ **=**	Scalar value representing the total MSW generation per town, calculated from the trace of

$\boldsymbol{Tr(diag(Wcom_{133})_{hh-cal})}$	$\boldsymbol{diag(Wcom_{133})_{hh-cal}}$ which is the aggregation of the MSW generation values per community and day for the 33 communities that make up the town of Betania.

Table A.3. Daily median MSW generation calculated for the individuals´ and households´ LOO from the correlations obtained and for the communities´ LOO obtained from the aggregation of household MSW generation by the total households located in each of the 33 communities of the town of Betania.

Community ID index[1]	$\boldsymbol{diag(Wind_{133})_{hh-cal}}$	$\boldsymbol{diag(Whh_{133})_{com-cal}}$	$\boldsymbol{diag(Wcom_{133})_{hh-cal}}$
1	0.42	0.92	1625
2	0.36	1.20	1192
3	0.59	2.02	2454
4	0.45	1.43	1956
5	0.32	0.60	638
6	0.33	1.45	2232
7	0.39	0.71	1438

8	0.75	2.98	845
9	1.09	2.59	251
10	0.44	1.07	342
11	0.68	1.94	178
12	0.42	1.09	447
13	0.51	2.21	454
14	0.49	1.88	691
15	0.44	1.71	142
16	0.63	1.73	81
17	0.58	1.62	136
18	0.29	1.47	137
19	0.23	1.38	59
20	0.78	1.88	46
21	0.46	1.74	262
22	0.62	2.29	957
23	0.56	2.04	368

24	0.68	1.83	254
25	0.65	1.91	1518
26	0.66	2.19	864
27	0.73	2.40	1844
28	0.52	1.93	1661
29	0.75	2.23	119
30	0.72	2.32	1544
31	0.58	1.96	2563
32	0.64	1.94	2057
33	0.69	2.06	981
Town of Betania $= (\boldsymbol{Wtown})_{\boldsymbol{hh-cal}} = \boldsymbol{Tr}(\boldsymbol{diag}(\boldsymbol{Wcom}_{\boldsymbol{133}})_{\boldsymbol{hh-cal}}) = 30338$ (Kg/town*day)			

[1] Community ID index referring to **Table A.1.**

Table A.4. HAC membership of communities per interval of MSW generation at the individuals´ and households´ LOO

Cluster membership

1	2	3	4	5
Individual level (kg/individual*day)				
(0.22, 0.36)	(0.39, 0.46)	(0.49, 0.59)	(0.62, 0.78)	1.09
(2)	(1)	(3)	(8)	(9)
(5)	(4)	(13)	(11)	
(6)	(7)	(14)	(16)	
(18)	(10)	(17)	(20)	
(19)	(12)	(23)	(22)	
	(15)	(28)	(24)	
	(21)	(31)	(25)	
			(26)	
			(27)	
			(29)	
			(30)	
			(32)	
			(33)	

Household Level (kg/household*day)				
(0.65, 0.75)	(1.00, 1.62)	(1.78, 2.27)	(2.39, 2.85)	3.28
(5)	(1)	(3)	(9)	(8)
(7)	(2)	(11)	(13)	
	(4)	(14)	(22)	
	(6)	(15)	(26)	
	(10)	(16)	(27)	
	(12)	(17)	(29)	
	(18)	(20)	(30)	
	(19)	(21)		
		(23)		
		(24)		
		(25)		
		(28)		
		(31)		
		(32)		