

Supplementary Materials for

Analysis of mismanaged plastic waste in Samoa to suggest proper waste management in Pacific Island Countries

This PDF file includes:

- **Table S1** Urban and rural populations and access to the municipal waste collection in Pacific island countries.
- **Table S2** Municipal solid waste and plastic waste generation in SPREP (Secretariat of the Pacific Regional Environment Programme) member countries, including Australia and New Zealand.
- **Table S3** Mismanaged plastic waste in SPREP countries, including Australia and New Zealand, (a) assuming all uncollected plastic waste is mismanaged; (b) assuming half of the uncollected plastic waste is mismanaged.

Table S1 Urban and rural populations and access to the municipal waste collection in Pacific island countries.

Island country/territory	Population (2014)			Estimated access to collection service		
	Urban	Rural	Total	% of urban population	% of rural population	% of national population
Cook Islands	11,248	3,952	15,200	100	0	74
Fiji	438,192	421,008	859,200	88*	35*	62
French Polynesia	133,314	128,086	261,400	100	0	51
Guam	164,406	10,494	174,900	100	100	100
Kiribati	58,752	50,048	108,800	100	0	54
Marshall Islands	40,108	14,092	54,200	66	1	49
Micronesia	22,660	80,340	103,000	35	0	8
Nauru	10,500	0	10,500	100	100	100
New Caledonia	173,530	85,470	259,000	100	0	67
Niue	1,500	0	1,500	100	100	100
Northern Mariana Islands	50,040	5,560	55,600	88*	35*	83
Palau	13,706	4,094	17,800	100	0	77
Papua New Guinea	961,805	6,436,695	7,398,500	88*	35*	42
Samoa	37,480	149,920	187,400	100	100	100
Solomon Islands	122,160	488,640	610,800	60	0	12
Tokelau	1,200	0	1,200	100	100	100
Tonga	23,759	79,541	103,300	100	62	71
Tuvalu	5,123	5,777	10,900	100	0	47
Vanuatu	63,528	201,172	264,700	50	0	12

Source (except *): SPREP, 2016

* Average of reported data

Table S2 Municipal solid waste and plastics waste generation in SPREP (Secretariat of the Pacific Regional Environment Programme) member countries, including Australia and New Zealand.

Country/ territory	Urban/ Rural	Waste generation rate (kg person ⁻¹ day ⁻¹)			Percentage of plastic (%)	Survey of waste generation and composition			Data source
		Househ old waste	Comme rcial waste	Total urban MSW		State etc.	State/ area type	Year	
Australia	—	—	—	2.2	4.0	—	—	—	World Bank, 2012
Cook Islands	Urban	—	—	1.2	12.0	—	—	—	PRIF, 2018
	Rural	—	—	1.2	12.0	—	—	—	PRIF, 2018
Fiji	Urban	0.4	1.50	1.9	7.1	Nadi	Urban	2008	<i>JICA, 2009</i>
	Urban	0.4	0.70	1.1	7.9	Lautoka	Urban	2008	<i>JICA, 2009</i>
	Urban (avg.)	—	—	1.5	7.5	—	—	—	—
	Rural	—	—	1.2	9.0	—	—	—	PRIF, 2018
French Polynesia	Urban	1.2*	0.68	1.9	14.1	All		2012	<i>Murzilli et al., 2012</i>
	Rural	—	—	1.2	14.1	—	—	—	Average
Guam	Urban	—	—	1.2	12.0	—	—	—	PRIF, 2018
	Rural	—	—	1.2	12.0	—	—	—	PRIF, 2018
Kiribati	Urban	—	—	1.2	13.0	—	—	—	PRIF, 2018
	Rural	—	—	1.2	13.0	—	—	—	PRIF, 2018
Marshall Islands	Urban	0.4	0.70	1.1	12.5	Majuro	Urban	2014	<i>SPREP, 2016</i>
	Rural	0.12	0.68	0.80	21.1	Ebeye	Rural	2015	<i>SPREP, 2016</i>
Micronesia	Urban	0.1	0.68	0.78	25	Pohnpei	Urban	2011	<i>JICA, 2011</i>
	Rural	0.5	0.68	1.2	37.2	Yap	Rural		
	Rural	0.2	0.68	0.88	22.5	Chuuk	Rural		
	Rural	0.1	0.68	0.78	20	Kosrae	Rural		
	Rural (avg.)	—	—	0.95	26.6	—	—	—	—

Nauru	Urban	–	–	1.2	14.1	–	–	–	Average
	Rural	–	–	1.2	14.1	–	–	–	Average
New Caledonia	Urban	–	–	1.2	12.0	–	–	–	PRIF, 2018
	Rural	–	–	1.2	12.0	–	–	–	PRIF, 2018
New Zealand	–	–	–	3.7	8.0	–	–	–	World Bank, 2012
Niue	Urban	–	–	1.2	14.1	–	–	–	Average
	Rural	–	–	1.2	14.1	–	–	–	Average
Northern Mariana Islands	Urban	–	–	1.2	14.1	–	–	–	Average
	Rural	–	–	1.2	14.1	–	–	–	Average
Palau	Urban	–	–	1.2	12.0	–	–	–	PRIF, 2018
	Rural	–	–	1.2	12.0	–	–	–	PRIF, 2018
Papua New Guinea	Urban	0.36	0.68	1.0	18.5	Port Moresby	Urban	2011	NCDC, 2011
	Rural	–	–	1.2	13.0	–	–	–	PRIF, 2018
Samoa	Urban	0.38	0.68	1.1	13.0	Vaitele	Urban (Apia)	2011	MNRE, 2011
	Rural	–	–	1.2	13.0	–	–	–	PRIF, 2018
Solomon Islands	Urban	0.86	0.09	0.95	19.5	Honiara	Urban	2011	<i>SPREP, 2016</i>
	Rural	–	–	1.2	25.2	Gizo	Rural		<i>SPREP, 2016</i>
Tokelau	Urban	–	–	1.2	14.1	–	–	–	Average
	Rural	–	–	1.2	14.1	–	–	–	Average
Tonga	Urban	–	–	1.2	6.0	–	–	–	PRIF, 2018
	Rural	0.5	0.70	1.2	13.4	Neiafu	Rural	2012	<i>SPREP, 2016</i>
	Rural	0.5	0.90	1.4	13.4	Vava'u	Rural		
	Rural (avg.)	–	–	1.3	13.4	–	–	–	–
Tuvalu	Urban	–	–	1.2	12.0	–	–	–	PRIF, 2018
	Rural	–	–	1.2	12.0	–	–	–	PRIF, 2018
Vanuatu	Urban	0.43	0.68	1.1	7.9	Port	Urban	2011	<i>Roger, 2013</i>

						Vila			
	Urban	1.2	0.18	1.4	5.0	Luganville	Urban	2014	<i>O'Reilly</i>
	Urban (avg.)	–	–	1.2	6.4	–	–	–	–
	Rural	–	–	1.2	9.0	–	–	–	PRIF, 2018

Table S3 Mismanaged plastic waste in SPREP countries, including Australia and New Zealand.

(a) assuming all uncollected plastic waste mismanaged; (b) assuming half of the uncollected plastic waste mismanaged

Country/territory	Urban/ rural	OUBL (outdoor use + backyard landfill) [kg day ⁻¹]		Littered plastic [kg day ⁻¹]	Mismanaged plastic waste [kg day ⁻¹]		Mismanaged plastic waste [kg person ⁻¹ day ⁻¹]	
		(a)	(b)		(a)	(b)	(a)	(b)
Australia	—	0	0	61,498	61,498	61,498	0.0036	0.0036
Cook Islands	Urban	102	51	63	164	113		
	Rural	528	275	22	550	297		
	Total	630	326	85	714	410	0.047	0.027
Fiji	Urban	5,823	2,912	1,972	7,795	4,883		
	Rural	28,467	14,233	1,757	30,224	15,991		
	Total	34,290	17,145	3,729	38,019	20,874	0.044	0.024
French Polynesia	Urban	2,298	1,149	1,414	3,712	2,563		
	Rural	20,098	10,468	837	20,936	11,305		
	Total	22,397	11,617	2,252	24,648	13,869	0.094	0.053
Guam	Urban	1,487	743	915	2,402	1,659		
	Rural	95	47	58	153	106		
	Total	1,582	791	973	2,555	1,764	0.015	0.010
Kiribati	Urban	576	288	354	930	642		
	Rural	7,243	3,772	302	7,544	4,074		

	Total	7,818	4,060	656	8,474	4,716	0.078	0.043
Marshall Islands	Urban	1,875	938	221	2,096	1,158		
	Rural	2,368	1,184	95	2,464	1,279		
	Total	4,243	2,122	316	4,559	2,438	0.084	0.045
Micronesia	Urban	2,877	1,439	177	3,054	1,616		
	Rural	19,349	10,079	809	20,158	10,888		
	Total	22,226	11,518	987	23,212	12,504	0.225	0.121
Nauru	Urban	112	56	69	180	124		
	Rural	0	0	0	0	0		
	Total	112	56	69	180	124	0.017	0.012
New Caledonia	Urban	1,569	785	966	2,535	1,751		
	Rural	11,417	5,946	476	11,893	6,422		
	Total	12,987	6,731	1,442	14,428	8,173	0.056	0.032
New Zealand	—	0	0	3,037	3,037	3,037	0.0118	0.0118
Niue	Urban	16	8	10	26	18		
	Rural	0	0	0	0	0		
	Total	16	8	10	26	18	0	0
Northern Mariana Islands	Urban	966	483	327	1,293	810		
	Rural	589	294	36	625	331		
	Total	1,555	777	364	1,918	1,141	0.035	0.021
Palau	Urban	124	62	76	200	138		

	Rural	547	285	23	570	308		
	Total	671	347	99	770	446	0.043	0.025
Papua New Guinea	Urban	21,889	10,945	7,412	29,301	18,357		
	Rural	628,658	314,329	38,811	667,469	353,140		
	Total	650,547	325,274	46,223	696,771	371,497	0.094	0.050
Samoa	Urban	336	168	207	543	375		
	Rural	1,469	734	904	2,373	1,638		
	Total	1,805	903	1,111	2,916	2,013	0.016	0.011
Solomon Islands	Urban	9,052	4,526	905	9,957	5,431		
	Rural	142,784	71,392	5,711	148,496	77,104		
	Total	151,836	75,918	6,617	158,453	82,535	0.259	0.135
Tokelau	Urban	13	6	8	21	14		
	Rural	0	0	0	0	0		
	Total	13	6	8	21	14	0.017	0.012
Tonga	Urban	107	54	66	174	120		
	Rural	5,219	2,609	554	5,773	3,163		
	Total	5,326	2,663	620	5,946	3,283	0.058	0.032
Tuvalu	Urban	46	23	29	75	52		
	Rural	772	402	32	804	434		
	Total	818	425	61	879	486	0.081	0.045
Vanuatu	Urban	2,546	1,273	204	2,750	1,477		

	Rural	20,994	10,497	840	21,834	11,337		
	Total	23,541	11,770	1,043	24,584	12,814	0.093	0.048
Total		942,412	472,456	131,198	1,073,610	603,655		

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