Seasonality of water quality and diarrheal disease counts in urban and rural settings in south India

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Table S1: Spearman's correlation coefficients for weekly aggregated meteorological and private domain water quality parameters used as predictors in the diarrheal disease count models. Urban site correlations are shown in the top and rural site on the bottom portions of the matrix.

	Temp	Rain ($\log_e$)	pH	NO_3^-	TDS	TC ($\log_{10}$)	FC ($\log_{10}$)
Temp	---	0.04	0.48*	-0.20	0.80*	-0.49*	0.40*
Rain ($\log_e$)	0.07	---	0.13	0.30	0.24	-0.25	-0.25
pH	0.33*	-0.07	---	-0.05	0.68*	-0.30	0.27
NO_3^-	-0.34	0.18	-0.19	---	-0.12	0.37*	0.07
TDS	0.02	0.05	0.15	-0.28	---	-0.47*	0.39*
TC ($\log_{10}$)	0.00	0.18	0.07	0.14	0.14	---	0.18
FC ($\log_{10}$)	0.44*	-0.09	0.05	-0.16	-0.02	0.20	---

* Indicates statistical significance at $\alpha < 0.05$ level

Table S2: Results of water quality regression models 1A, 2A and 3A

	pH		NO$_3^-$ (ppm)		TDS (ppm)		TC (log$_{10}$) (CFU/100 mL)		FC (log$_{10}$) (CFU/100 mL)	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
MODEL 1A[#]										
PUBLIC	[26]	[20]	[41]	[54]	[31]	[5]	[20]	[18]	[7]	[19]
Intercept	8.727***	7.178***	17.14***	19.67***	901.2***	864.9***	5.993***	2.780***	5.128***	1.589***
	(0.429)	(0.064)	(3.295)	(0.532)	(104.6)	(24.62)	(0.569)	(0.079)	(0.674)	(0.099)
Week	-0.022*	0.008***	0.004	-0.068***	-0.392	-0.191	-0.071***	0.006***	-0.071***	0.010***
	(0.010)	(0.001)	(0.077)	(0.009)	(2.430)	(0.414)	(0.013)	(0.001)	(0.016)	(0.002)
TS1	0.305*	0.236***	-0.584	-0.933	-31.79	-142.2***	1.091***	0.196*	0.572**	-0.309**
	(0.122)	(0.064)	(0.940)	(0.535)	(29.85)	(24.77)	(0.162)	(0.079)	(0.190)	(0.099)
TS2	0.468*	0.166**	6.905***	6.343***	-72.65	-93.80***	1.701***	0.495***	1.051***	-0.132
	(0.191)	(0.060)	(1.465)	(0.498)	(46.52)	(23.10)	(0.253)	(0.074)	(0.297)	(0.093)
TS3	-0.026	-0.130	3.617	11.57***	-185.7**	-110.8***	2.443***	0.479***	1.762***	-0.196
	(0.259)	(0.072)	(1.990)	(0.601)	(63.18)	(27.83)	(0.344)	(0.089)	(0.404)	(0.111)
TS4	0.846*	-0.169**	-1.390	1.882***	-156.9	-85.64***	2.887***	0.292***	2.129***	-0.737***
	(0.339)	(0.057)	(2.606)	(0.472)	(82.74)	(21.85)	(0.450)	(0.070)	(0.530)	(0.088)
TS5	-0.047	0.326***	-1.279	-1.593**	-148.6***	-113.7***	-0.536**	0.086	-0.918***	-0.146
	(0.127)	(0.061)	(0.975)	(0.504)	(30.97)	(23.34)	(0.168)	(0.075)	(0.200)	(0.094)
PRIVATE	[43]	[17]	[35]	[62]	[44]	[19]	[10]	[1]	[10]	[11]
Intercept	7.321***	7.269***	22.06***	19.86***	853.3***	987.6***	3.819***	3.675***	2.739***	3.045***
	(0.075)	(0.082)	(0.554)	(0.546)	(15.94)	(31.97)	(0.086)	(0.096)	(0.127)	(0.144)
Week	0.019***	0.0073***	-0.129***	-0.070***	0.864**	0.469	-0.007***	-0.005	0.000	-0.004*
	(0.001)	(0.001)	(0.010)	(0.007)	(0.290)	(0.434)	(0.002)	(0.001)	(0.002)	(0.002)
TS1	-0.323***	0.0971	1.707**	-0.341	-31.58*	-260.0***	0.179*	0.018	-0.747***	-0.646***
	(0.071)	(0.083)	(0.520)	(0.552)	(14.95)	(32.27)	(0.081)	(0.097)	(0.119)	(0.145)
TS2	-0.558***	0.0536	8.212***	9.641***	-139.0***	-335.0***	0.353***	0.059	-0.368**	-0.553***
	(0.075)	(0.095)	(0.553)	(0.631)	(15.91)	(36.92)	(0.086)	(0.111)	(0.127)	(0.166)
TS3	-1.243***	-0.2484**	6.731***	9.471***	-199.0***	-278.1***	0.351***	-0.075	-0.602***	-0.979***
	(0.076)	(0.088)	(0.555)	(0.581)	(15.95)	(34.00)	(0.087)	(0.103)	(0.127)	(0.153)
TS4	-0.721***	-0.3257***	1.739***	3.158***	-220.5***	-334.7***	0.385***	-0.096	-0.674***	-0.835***
	(0.058)	(0.080)	(0.427)	(0.529)	(12.28)	(30.95)	(0.067)	(0.093)	(0.098)	(0.139)
TS5	-0.149	0.0352	-1.045	-1.122*	-48.84**	-298.2***	-0.053	-0.144	-0.084	-0.527***
	(0.083)	(0.084)	(0.613)	(0.559)	(17.61)	(32.73)	(0.096)	(0.099)	(0.140)	(0.147)
MODEL 2A										
PUBLIC	[22]	[19]	[47]	[63]	[33]	[2]	[17]	[20]	[0]	[17]
Intercept	7.242***	7.191***	18.13***	24.22***	664.6***	758.0***	3.596***	3.021***	2.289***	1.215***
	(0.186)	(0.061)	(1.323)	(0.449)	(43.64)	(23.75)	(0.246)	(0.074)	(0.298)	(0.094)
Week	0.011**	0.009***	0.006	-0.099***	2.217**	0.133	-0.005	0.006***	-0.005	0.012***
	(0.004)	(0.001)	(0.025)	(0.008)	(0.819)	(0.439)	(0.005)	(0.001)	(0.006)	(0.002)
Sin (2π)	-0.382***	-0.135***	3.042***	6.389***	-92.22***	-30.12**	0.401***	0.240***	0.087	-0.138**
	(0.068)	(0.028)	(0.487)	(0.209)	(16.05)	(11.05)	(0.091)	(0.034)	(0.109)	(0.044)
Cos (2π)	0.081*	0.151***	0.887***	0.126	90.61***	-0.687	-0.099*	0.040	-0.009	0.204***
	(0.036)	(0.022)	(0.257)	(0.162)	(8.475)	(8.544)	(0.048)	(0.026)	(0.057)	(0.034)
Sin (4π)	0.275***	0.185***	1.292***	-0.769***	21.31	-0.156	-0.012	0.104***	-0.047	0.196***
	(0.048)	(0.024)	(0.344)	(0.177)	(11.36)	(9.359)	(0.064)	(0.029)	(0.076)	(0.037)
Cos (4π)	0.157***	0.054*	-2.630***	-2.674***	-14.85	-10.03	0.179***	0.091***	0.012	-0.125***
	(0.036)	(0.022)	(0.257)	(0.166)	(8.476)	(8.761)	(0.048)	(0.027)	(0.058)	(0.035)

PRIVATE	[41]	[21]	[46]	[68]	[43]	[6]	[11]	[2]	[11]	[10]
Intercept	6.899***	7.289***	25.85***	21.02***	739.0***	728.3***	4.041***	3.669***	2.266***	2.515***
	(0.070)	(0.060)	(0.460)	(0.372)	(14.53)	(25.48)	(0.078)	(0.071)	(0.114)	(0.107)
Week	0.018***	0.006***	-0.150***	-0.038***	0.995***	0.335	-0.007***	-0.001	0.002	-0.006**
	(0.001)	(0.001)	(0.009)	(0.007)	(0.289)	(0.467)	(0.002)	(0.001)	(0.002)	(0.002)
Sin (2π)	-0.482***	-0.070*	5.071***	5.099***	-82.40***	-55.73***	0.196***	0.059	-0.319***	-0.217***
	(0.036)	(0.032)	(0.241)	(0.198)	(7.598)	(13.55)	(0.041)	(0.034)	(0.060)	(0.057)
Cos (2π)	0.201***	0.161***	1.062***	0.202	76.56***	35.71**	-0.081*	0.055	-0.058	0.109*
	(0.030)	(0.028)	(0.201)	(0.174)	(6.339)	(11.90)	(0.034)	(0.033)	(0.050)	(0.050)
Sin (4π)	0.167***	0.192***	0.431	-0.396*	17.92*	-13.21	0.044	0.086*	0.172**	0.139*
	(0.035)	(0.031)	(0.229)	(0.196)	(7.228)	(13.41)	(0.039)	(0.038)	(0.057)	(0.056)
Cos (4π)	0.050	0.058	-1.506***	-3.055***	-15.49**	-39.53**	0.067*	0.065	-0.233***	-0.068
	(0.027)	(0.030)	(0.177)	(0.189)	(5.594)	(12.92)	(0.030)	(0.036)	(0.044)	(0.054)

MODEL 3A

PUBLIC	[26]	[21]	[56]	[63]	[36]	[6]	[18]	[21]	[2]	[19]
Intercept	10.44***	9.219***	-15.69**	24.42***	190.8	1819***	4.550***	3.587***	-0.008	2.249**
	(0.904)	(0.504)	(5.994)	(3.765)	(211.2)	(194.6)	(1.218)	(0.613)	(1.474)	(0.780)
Week	0.008*	0.009***	0.040	-0.101***	2.721**	0.155	-0.005	0.006***	-0.003	0.011***
	(0.004)	(0.001)	(0.023)	(0.008)	(0.825)	(0.437)	(0.005)	(0.001)	(0.006)	(0.002)
Sin (2π)	-0.623***	-0.309***	3.844***	6.214***	-89.71***	-123.5***	0.372**	0.150*	0.345*	-0.289***
	(0.094)	(0.049)	(0.625)	(0.369)	(22.00)	(19.07)	(0.127)	(0.060)	(0.155)	(0.077)
Cos (2π)	0.423***	0.362***	-2.737***	-0.001	39.76	107.6***	0.004	0.060	-0.252	0.254**
	(0.101)	(0.061)	(0.670)	(0.458)	(23.60)	(23.65)	(0.136)	(0.075)	(0.165)	(0.095)
Sin (4π)	0.265***	0.205***	1.415***	-0.684***	23.12*	11.31	-0.016	0.131***	-0.044	0.239***
	(0.048)	(0.025)	(0.316)	(0.185)	(11.14)	(9.555)	(0.064)	(0.030)	(0.076)	(0.038)
Cos (4π)	0.009	-0.035	-1.299***	-2.589***	2.655	-54.90***	0.140	0.091*	0.132	-0.133*
	(0.053)	(0.039)	(0.353)	(0.252)	(12.45)	(13.04)	(0.072)	(0.041)	(0.088)	(0.052)
Temperature	-0.108***	-0.071***	1.074***	-0.014	14.73*	-37.28***	-0.031	-0.022	0.080	-0.039
	(0.029)	(0.017)	(0.195)	(0.130)	(6.877)	(6.694)	(0.040)	(0.021)	(0.048)	(0.027)
Rain ($\log_{10}$)	0.035	-0.003	1.823***	0.419	36.53***	4.280	-0.043	0.110*	-0.126	0.163**
	(0.042)	(0.036)	(0.285)	(0.268)	(10.04)	(13.88)	(0.058)	(0.044)	(0.071)	(0.055)

PRIVATE	[42]	[22]	[51]	[69]	[44]	[8]	[12]	[3]	[12]	[14]
Intercept	9.494***	8.107***	2.636	16.90***	537.4**	1189***	2.153*	4.590***	-0.493	6.492***
	(0.810)	(0.597)	(5.137)	(3.675)	(169.2)	(253.9)	(0.913)	(0.715)	(1.336)	(1.057)
Week	0.017***	0.006***	-0.159***	-0.041***	0.774*	0.570	-0.005**	-0.001	0.005*	-0.006**
	(0.002)	(0.001)	(0.010)	(0.007)	(0.323)	(0.468)	(0.002)	(0.001)	(0.003)	(0.002)
Sin (2π)	-0.667***	-0.157**	5.840***	5.679***	-82.52***	-105.5***	0.402***	-0.041	-0.016	-0.494***
	(0.078)	(0.059)	(0.493)	(0.364)	(16.23)	(25.12)	(0.088)	(0.071)	(0.128)	(0.105)
Cos (2π)	0.490***	0.209**	-2.074***	0.217	45.07*	61.75*	-0.247*	0.105	-0.299*	0.614***
	(0.092)	(0.069)	(0.582)	(0.424)	(19.18)	(29.25)	(0.104)	(0.082)	(0.152)	(0.122)
Sin (4π)	0.172***	0.229***	0.261	-0.784***	15.48*	8.065	0.051	0.129**	0.182**	0.099
	(0.035)	(0.034)	(0.219)	(0.210)	(7.210)	(14.47)	(0.039)	(0.041)	(0.057)	(0.060)
Cos (4π)	-0.074	0.045	-0.234	-3.196***	-3.183	-45.93*	0.144**	0.053	-0.121*	-0.348***
	(0.046)	(0.044)	(0.291)	(0.274)	(9.597)	(18.91)	(0.052)	(0.053)	(0.076)	(0.079)
Temperature	-0.087**	-0.031	0.775***	0.176	6.671	-17.68*	0.064*	-0.035	0.094*	-0.132***
	(0.027)	(0.021)	(0.173)	(0.128)	(5.696)	(8.854)	(0.031)	(0.025)	(0.045)	(0.037)
Rain ($\log_{10}$)	-0.035	0.077*	1.839***	-1.009***	27.82**	45.06**	-0.099*	0.092*	-0.150*	-0.296***
	(0.042)	(0.039)	(0.266)	(0.242)	(8.756)	(16.70)	(0.047)	(0.047)	(0.069)	(0.069)

Reference category for Model 1A is TS6 (spring).

Regression coefficient (Standard Error) are presented; statistical significance is indicated by ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$. Q-value of the model denoted in brackets.

Table S3: Results of diarrheal disease count regression models 1B, 2B, 3B and 4 with no temporal lags

	Urban	Rural	Combined
MODEL 1B	[16]	[22]	[18]
Intercept	-5.443*** (0.294)	-5.336*** (0.390)	-5.414*** (0.233)
Week	-0.016*** (0.003)	-0.025*** (0.006)	-0.020*** (0.003)
TS1	0.141 (0.355)	-0.139 (0.476)	0.042 (0.284)
TS2	0.327 (0.305)	0.092 (0.405)	0.259 (0.242)
TS3	-0.345 (0.331)	-0.426 (0.439)	-0.361 (0.263)
TS4	0.480 (0.295)	0.390 (0.384)	0.467* (0.233)
TS5	0.382 (0.305)	-0.352 (0.474)	0.236 (0.249)
MODEL 2B	[13]	[20]	[15]
Intercept	-5.196*** (0.159)	-5.293*** (0.257)	-5.219*** (0.135)
Week	-0.017*** (0.003)	-0.027*** (0.006)	-0.021*** (0.003)
Sin (2π)	-0.009 (0.118)	0.083 (0.183)	0.016 (0.098)
Cos (2π)	0.023 (0.106)	0.022 (0.164)	0.003 (0.089)
Sin (4π)	0.077 (0.106)	-0.060 (0.168)	0.050 (0.089)
Cos (4π)	0.284* (0.111)	0.334 (0.173)	0.298** (0.093)
MODEL 3B	[24]	[25]	[19]
Intercept	7.136** (2.509)	-6.786 (4.063)	2.984 (2.103)
Week	-0.017*** (0.003)	-0.026*** (0.006)	-0.020*** (0.003)
Sin (2π)	-0.874*** (0.232)	-0.080 (0.380)	-0.655*** (0.197)
Cos (2π)	1.375*** (0.299)	-0.276 (0.451)	0.846*** (0.246)
Sin (4π)	0.162 (0.110)	-0.016 (0.173)	0.123 (0.093)
Cos (4π)	-0.399* (0.178)	0.500 (0.268)	-0.118 (0.146)
Temperature	-0.425*** (0.087)	0.035 (0.141)	-0.288*** (0.073)
Rain (log_{10})	-0.295 (0.156)	0.507* (0.204)	-0.027 (0.123)
MODEL 4[#]	[37]	[38]	[18]
Intercept	-11.84 (6.313)	-2.993 (8.552)	-3.240 (4.218)
Week	0.023 (0.018)	-0.016 (0.011)	-0.011 (0.007)
Sin (2π)	-0.052 (0.569)	-0.237 (0.794)	-0.057 (0.385)
Cos (2π)	-0.359 (0.632)	-0.539 (0.910)	0.300 (0.422)
Sin (4π)	0.045 (0.237)	0.254 (0.354)	-0.170 (0.173)
Cos (4π)	-0.441 (0.301)	0.890 (0.554)	-0.396 (0.242)
Temperature	-0.068 (0.169)	0.007 (0.229)	-0.180 (0.120)
Rain (log_{10})	-0.558* (0.272)	0.542 (0.347)	-0.137 (0.168)
Med pH	-0.261 (0.407)	-0.332 (0.672)	0.182 (0.259)
Med NO_3^-	-0.009 (0.042)	0.098 (0.074)	-0.026 (0.028)
Med TDS	0.008* (0.004)	0.002 (0.001)	0.001 (0.001)
Med TC (log_{10})	1.447* (0.627)	-1.120 (0.695)	0.407 (0.393)
Med FC (log_{10})	-1.127*** (0.307)	-0.012 (0.362)	-0.306 (0.174)

Results of version 1 are presented, where only private domain weekly median values are used with no interpolation.

Regression coefficient (Standard Error) are presented; statistical significance is indicated by
***$p < 0.001$, **$p < 0.01$, *$p < 0.05$. Q-value of the model is denoted in brackets.