Table S3. Estimated model parameters for Kutch.

	Kutch					
	VSEIRS without rain	VS^2EI^2 without rain	VSEIRS with rain	VS^2EI^2 with rain	confidence	interval
μ_{IR}	13.587	–	39.021	–	(–	, –)
μ_{RS}	0.116	–	5.657	–	(–	, –)
$\mu_{S_2S_1}$	–	0.230	–	0.334	(0.067	, 3.270)
μ_{EI}	7.301	7.408	10.480	8.902	(8.885	, 17.277)
$\mu_{I_1I_2}$	–	11.544	–	5.511	(3.218	, ∞)
$\mu_{I_2S_2}$	–	0.004	–	0.035	(0	, 0.073)
$\mu_{I_1S_1}$	–	2.320	–	6.563	(0	, ∞)
β_1	-0.076	-2.469	1.242	1.201	(-4.819	, 4.109)
β_2	1.287	2.001	3.590	2.088	(-0.153	, 6.616)
β_3	4.446	4.227	3.906	3.866	(1.874	, 6.939)
β_4	2.868	2.786	3.747	2.808	(1.092	, 6.042)
β_5	6.709	6.534	5.742	5.996	(4.695	, 9.749)
β_6	6.319	7.080	4.803	5.333	(3.912	, 8.287)
τ	0.025	0.022	0.033	0.030	(0.015	, 0.084)
σ	0.347	0.309	0.225	0.243	(0.162	, 0.259)
ρ	0.022	0.030	0.005	0.015	(0.007	, 0.025)
$q \times 10^4$	–	4.763	–	9.424	(0.100	, 48.102)
σ_{obs}	0.384	0.390	0.390	0.395	(0.365	, 0.445)
β_r	–	–	0.489	0.512	(0.270	, 0.765)
S_0	0.494	–	0.956	–	(–	, –)
$S_{1.0}$	–	0.164	–	0.138	(0.001	, 0.900)
E_0	0.003	0.002	0.014	0.004	(0.003	, 0.009)
I_0	0.011	–	0.002	–	(–	, –)
$I_{1.0}$	–	0.002	–	0.002	(0	, 0.087)
$I_{2.0}$	–	0.067	–	0.080	(0	, 0.754)
R_0	0.505	–	0.038	–	(–	, –)
$S_{2.0}$	–	0.765	–	0.775	(0.276	, 0.900)
$\kappa_0 \times 10$	0.079	0.133	0.189	0.171	(0	, ∞)
$\lambda_0 \times 10$	0.050	0.045	0.058	0.061	(0	, ∞)
c	–	0.004	–	0.010	(0.001	, 0.067)

Corresponding units and parameter descriptions are given in Table S2. The columns marked VSEIRS and VS^2EI^2 correspond to maximum likelihood point estimates for each type of model, with and without including rainfall. The last two columns give the lower and upper bounds for approximate 95% confidence intervals for the VS^2EI^2 model with rainfall, derived from profile likelihood computations as shown in Figures S7 and S8; values of 0, 1 and ∞ correspond to confidence intervals extending to the boundary of the parameter space.