

# The effects of changing land use and flood hazard on poverty in coastal Bangladesh

## Supplementary tables

Table S1. Influence of driving forces on LULC change

<b>Factors</b>	<b>LULC 1 to LULC 3</b>	<b>LULC 1 to LULC 6</b>	<b>LULC 2 to LULC 3</b>	<b>LULC 3 to LULC 1</b>	<b>LULC 3 to LULC 2</b>	<b>LULC 3 to LULC 5</b>	<b>LULC 5 to LULC 1</b>	<b>LULC 5 to LULC 2</b>	<b>LULC 5 to LULC 3</b>
Intercept	2.38	-2.01	-0.57	-3.92	-5.86	-1.35	0.50	-1.51	2.14
Elevation	-0.32	-0.49	-0.03	0.32	0.03	0.10	-0.10	-0.51	-0.63
Curvature		0.39		-0.20	-0.01	-0.03			
Flood frequency	0.01	0.79	-0.41	0.13	0.72	0.17	-0.22	0.61	-0.18
Distance from aquaculture land								-0.10	
Distance from existing road	-0.06			0.08		0.02	0.02	0.02	0.03
Distance from residential area						-0.22			
Distance from adjacent river			0.004						
Distance from drainage channel			0.006	0.04				-0.03	
Distance from growth centre						0.03			
Soil salinity	-0.08			0.05	0.31	0.11	-0.18	0.17	-0.06
Easting coordinates	0.16		0.07	0.07	0.21	0.05	2e <sup>-04</sup>	-0.17	
Northing coordinates	-0.11	-0.02	0.02		-0.11			0.16	
Population density									
Slope	-1e <sup>-04</sup>		7e <sup>-05</sup>						
<b>ROC</b>	<b>0.71</b>	<b>0.89</b>	<b>0.74</b>	<b>0.67</b>	<b>0.89</b>	<b>0.68</b>	<b>0.63</b>	<b>0.94</b>	<b>0.82</b>
<b>Adjusted odds ratio</b>	<b>5.23</b>	<b>17.82</b>	<b>8.10</b>	<b>4.28</b>	<b>14.38</b>	<b>2.96</b>	<b>2.07</b>	<b>35.74</b>	<b>9.81</b>

*LULC 1 = Agriculture; LULC 2 = Aquaculture; LULC 3 = Bare land; LULC 4 = Built-up area (urban); LULC 5 = Vegetation with rural settlement; LULC 6 = Waterbody*

Table S2. Markov Chain transition probability matrix of LULC change

	<b>LULC class</b>	<b>Agriculture</b>	<b>Aquaculture</b>	<b>Bare land</b>	<b>Built-up area (urban)</b>	<b>Vegetation with rural settlement</b>	<b>Waterbody</b>
Transition probability of 2019 based on the transition matrix of 2005-2010	Agriculture	0.0571	0.4943	0.0713	0.0425	0.2160	0.1189
	Aquaculture	0.0112	0.6845	0.0310	0.0198	0.0492	0.2044
	Bare land / others	0.0983	0.2865	0.2527	0.0227	0.2853	0.0546
	Built-up area (urban)	0.0062	0.1078	0.0121	0.7319	0.0356	0.1063
	Vegetation with rural settlement	0.1226	0.2433	0.1075	0.0246	0.4708	0.0312
	Waterbody	0.0044	0.6815	0.0204	0.0079	0.0236	0.2622
Transition probability of 2030 based on the transition matrix of 2010-2019	Agriculture	0.2296	0.1756	0.2314	0.0189	0.3439	0.0007
	Aquaculture	0.0080	0.7358	0.0724	0.0355	0.0677	0.0806
	Bare land / others	0.0779	0.2742	0.4352	0.0266	0.1790	0.0071
	Built-up area (urban)	0.0007	0.0422	0.0128	0.9310	0.0081	0.0053
	Vegetation with rural settlement	0.0585	0.1897	0.0947	0.0264	0.6257	0.0051
	Waterbody	0.0000	0.7527	0.0569	0.0222	0.0261	0.1421

Table S3. Autocorrelation diagnosis of monthly precipitation

<b>Month</b>	<b>Autocorrelation</b>	<b>Significant</b>
January	-0.12	FALSE
February	0.14	FALSE
March	-0.14	FALSE
April	0.02	FALSE
May	0.18	FALSE
June	-0.01	FALSE
July	0.09	FALSE
August	-0.14	FALSE
September	-0.14	FALSE
October	-0.21	FALSE
November	-0.24	FALSE
December	-0.17	FALSE

## Supplementary Figures

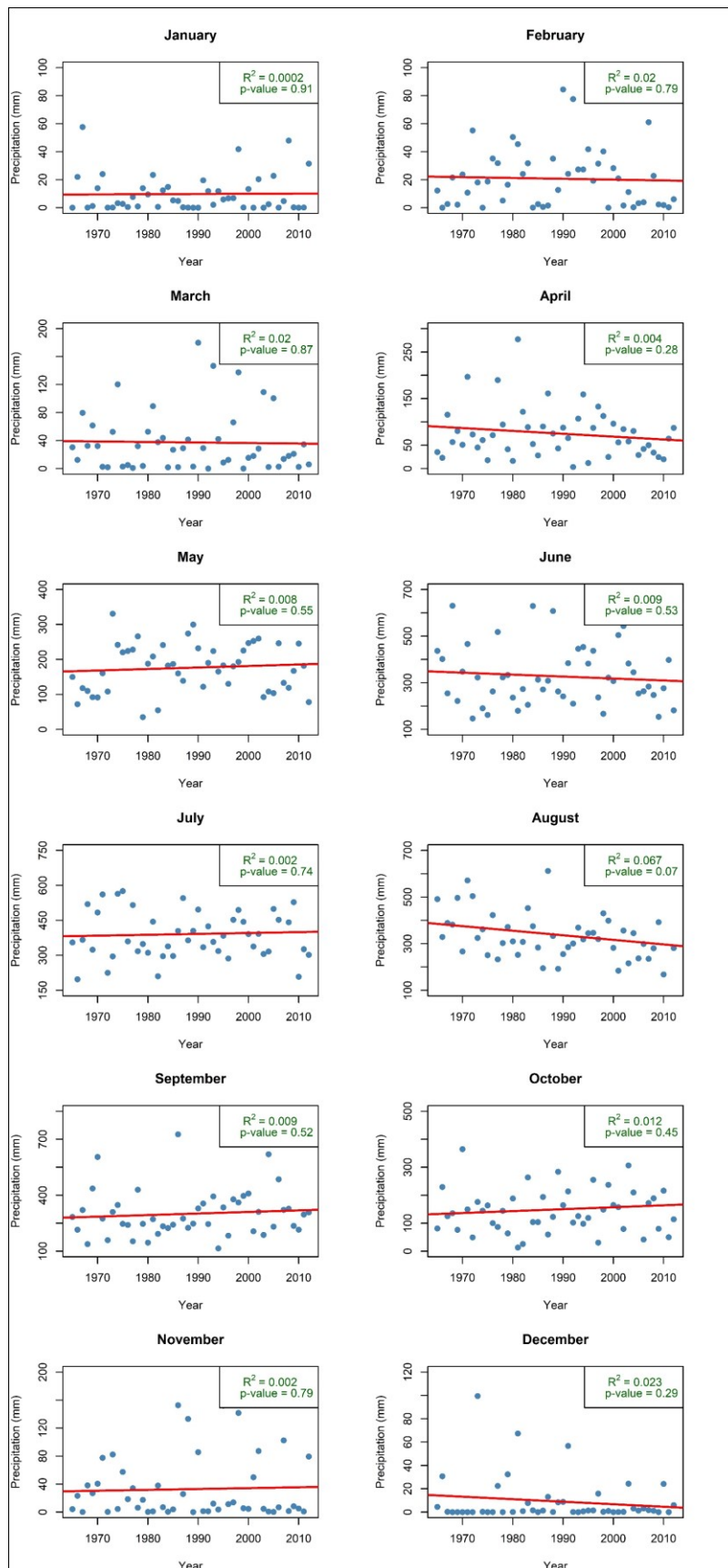


Figure S1. Trend of monthly rainfall from 1965 to 2012

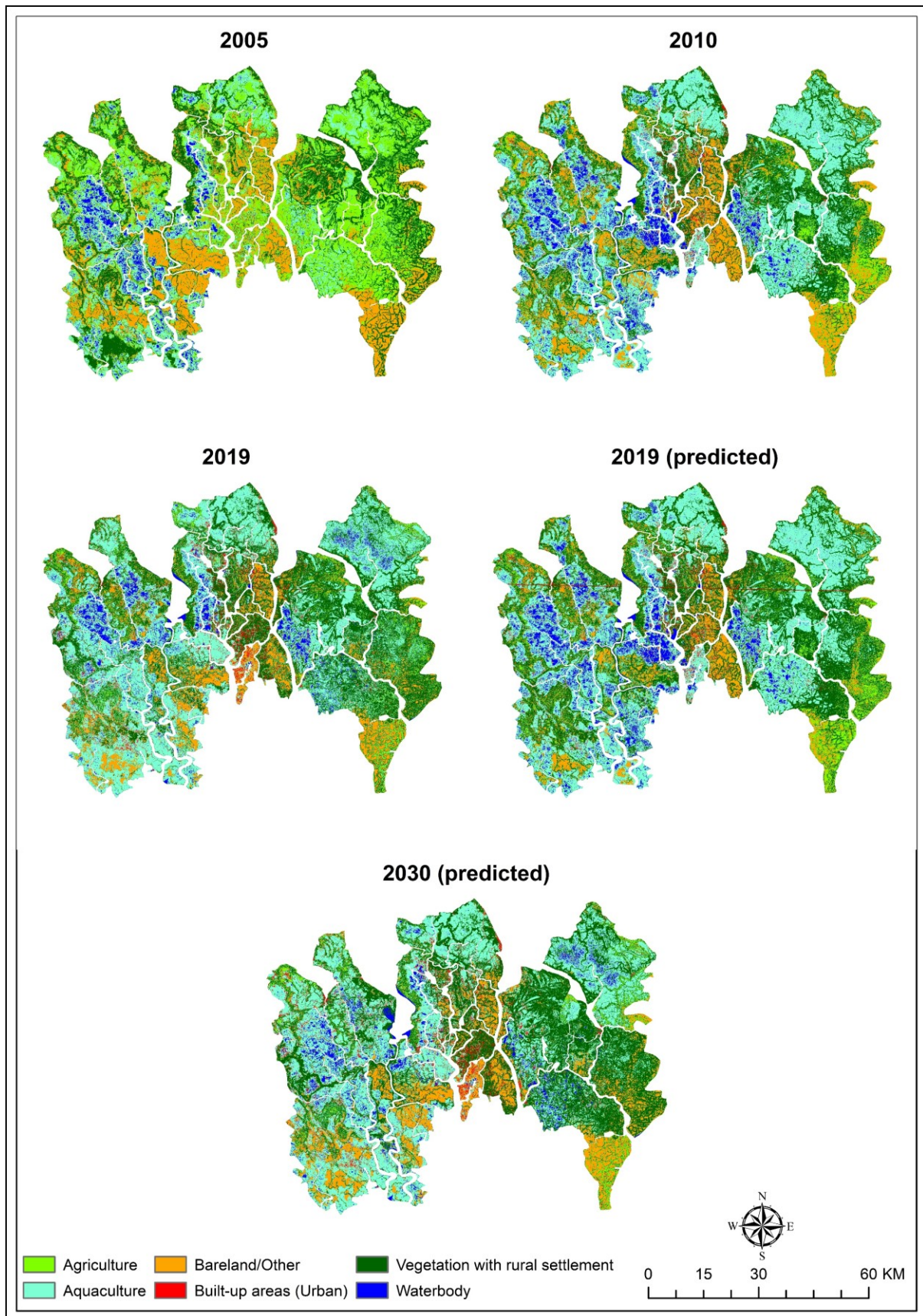


Figure S2. Predicted and observed LULC change between 2005 and 2030

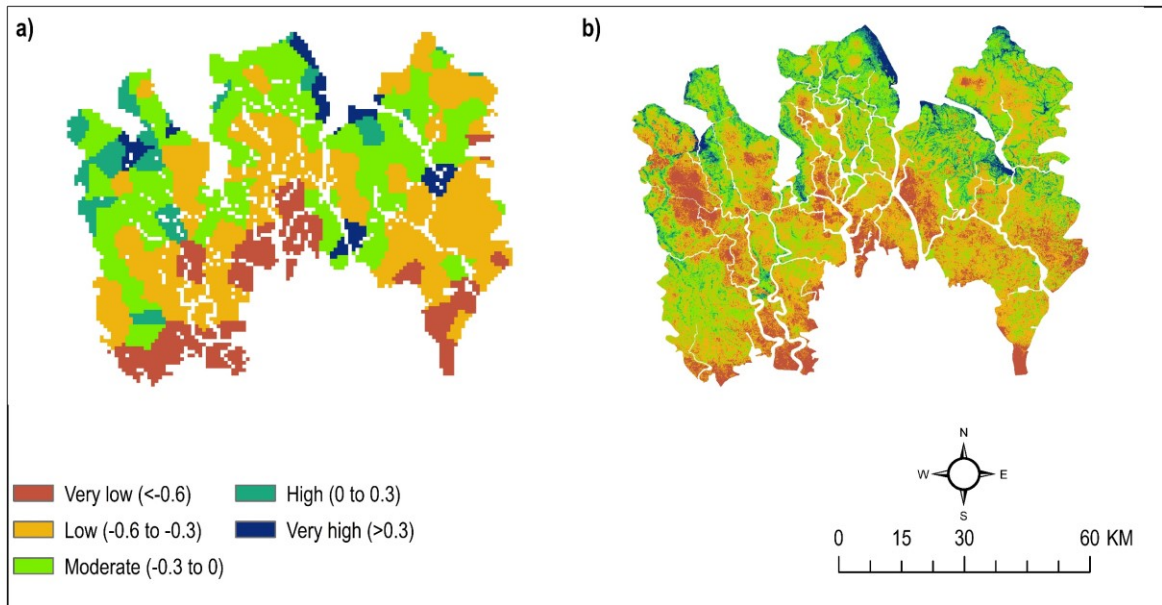


Figure S3. Wealth Index in 2010: a) obtained from Steele et al. (2017); and b) downscaled for this study

## References

Steele, J.E., Sundsøy, P.R., Pezzulo, C., Alegana, V.A., Bird, T.J., Blumenstock, J., Bjelland, J., Engø-Monsen, K., de Montjoye, Y.-A., Iqbal, A.M., 2017. Mapping poverty using mobile phone and satellite data. *Journal of The Royal Society Interface* 14, 20160690.