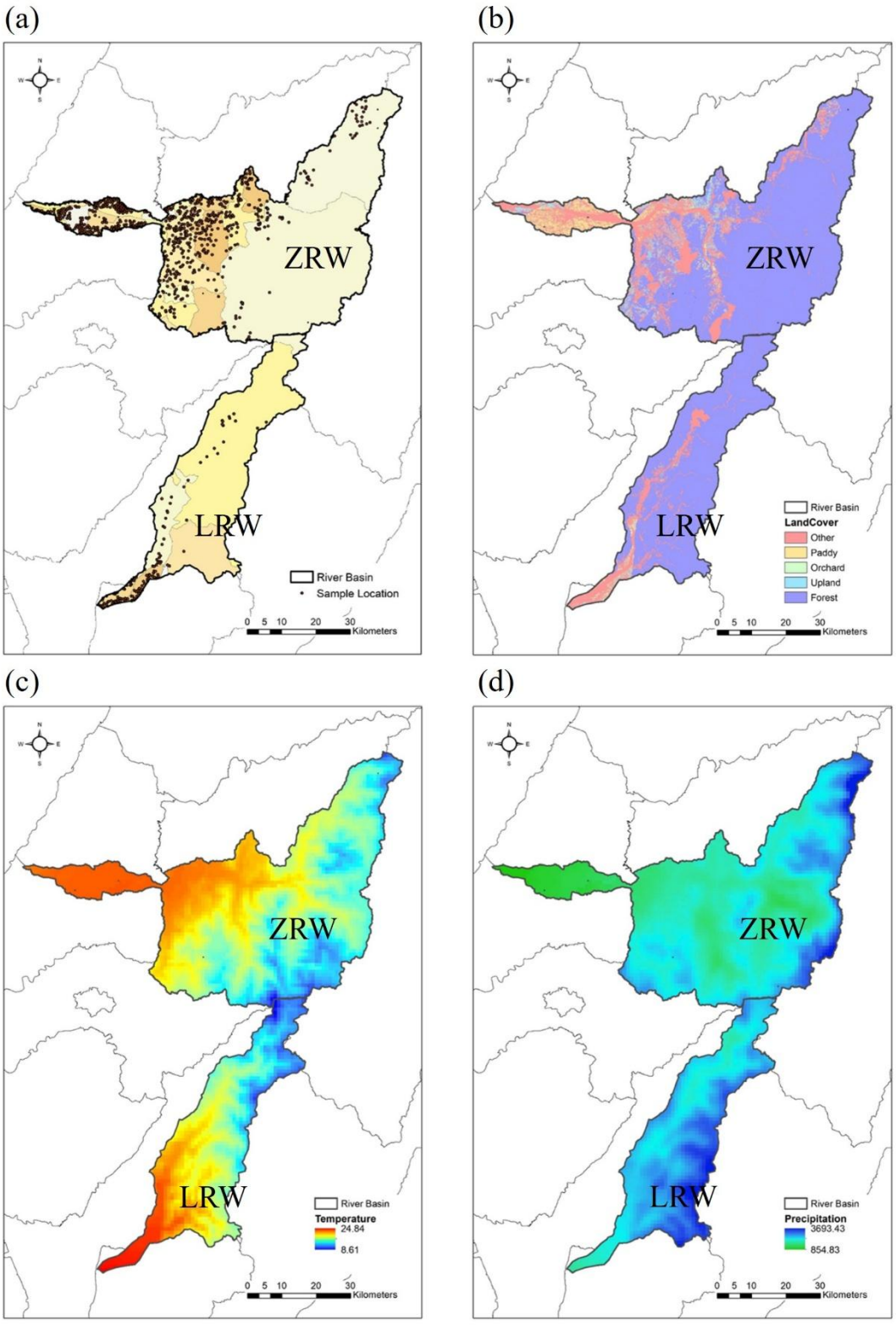

Figure S1. The DEM, land cover, mean annual temperature and total annual precipitation of the Zhuoshui River watershed (ZRW) and the Laonong River watershed (LRW).

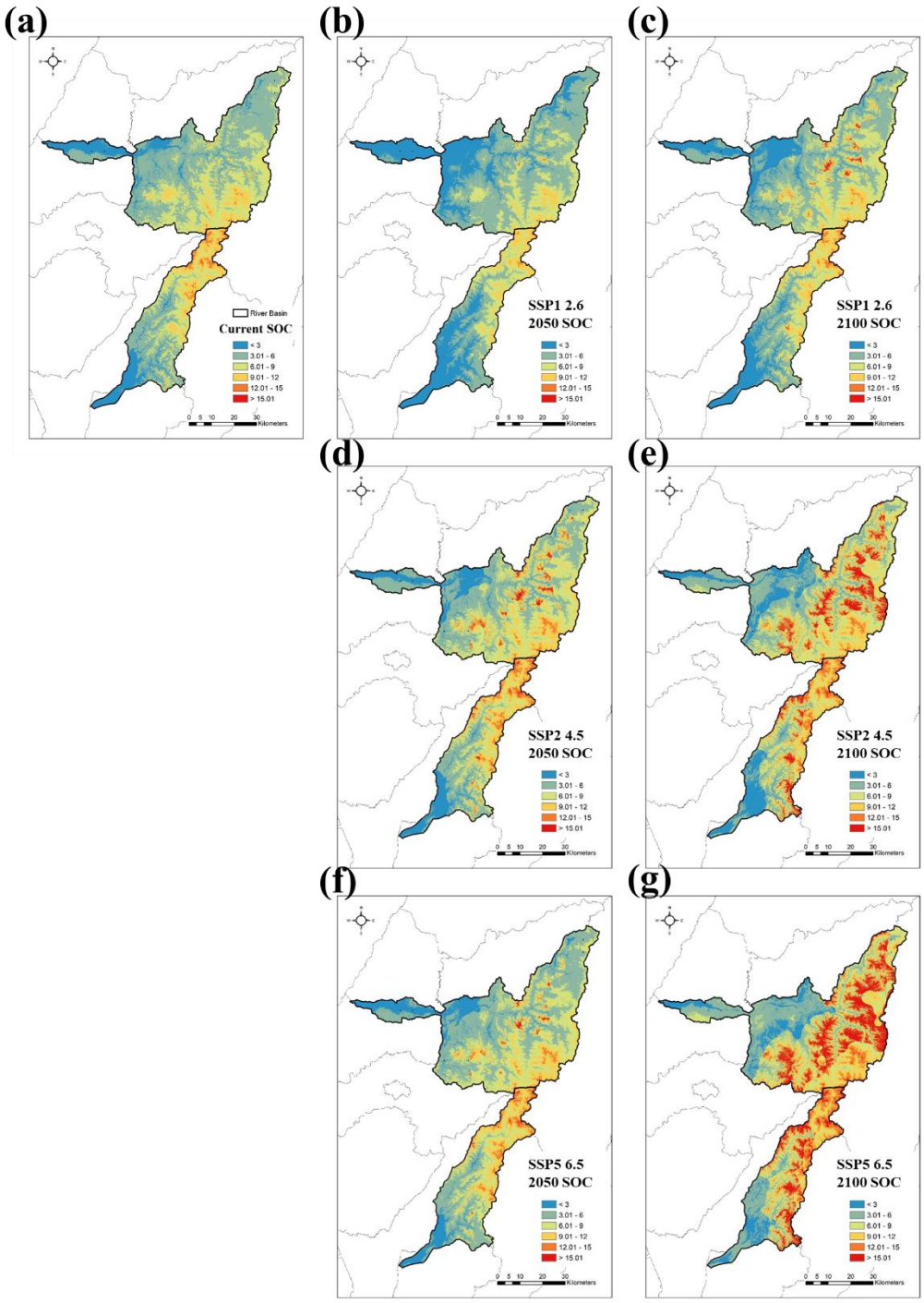

Fig. S2. Spatio-temporal distribution of SOC stock under different emission scenarios in mid-century and end- century at Zhousui and Laonong River watersheds: (a) SOC stock in 2020 (baseline); (b) SOC stock under SSP1-2.6 in 2050; (c)SOC stock under SSP1-2.6 in 2100; (d) SOC stock under SSP2-4.5 in 2050; (e) SOC stock under SSP2-4.5 in 20100; (f) SOC stock under SSP5-8.5 in 2050; (g) SOC stock under SSP5-8.5 in 2100.

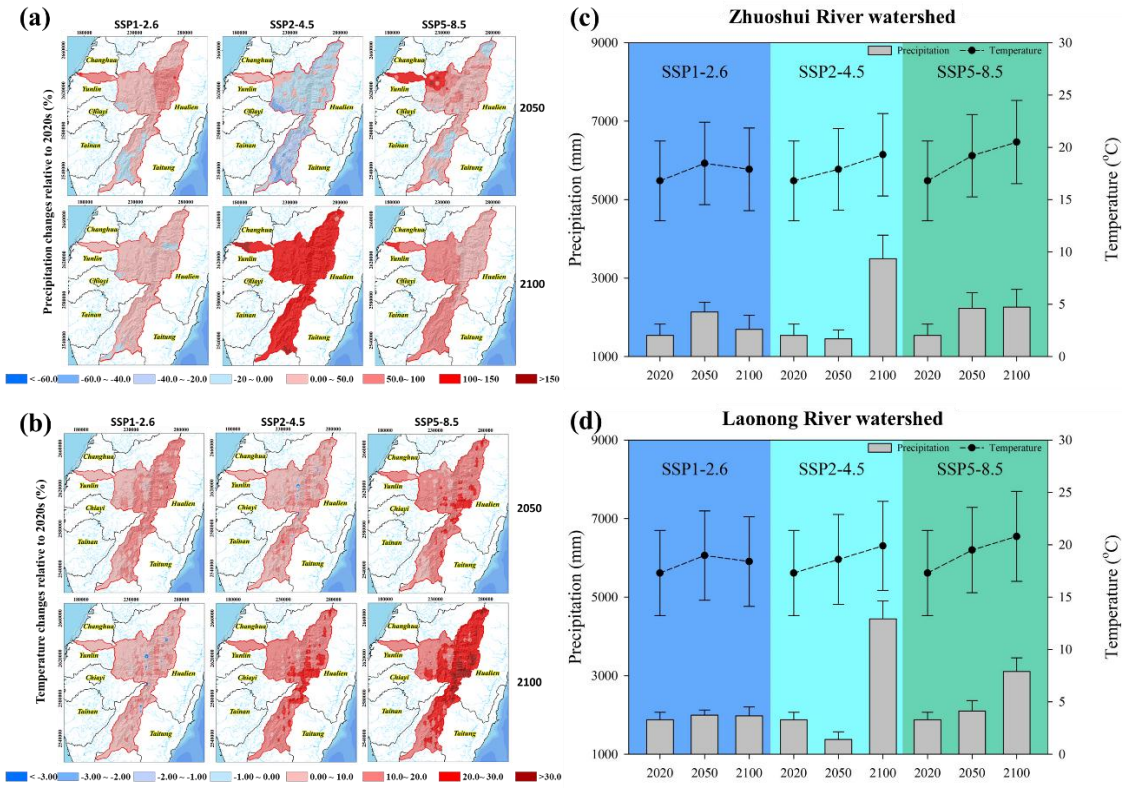

Fig. S3. Distribution of precipitation (a) and temperature (b) in 2050 and 2100 under different emission scenarios based on CMIP6 data; and the average value of temperature and precipitation of ZRW and LRW under different emission scenarios in 2020, 2050 and 2100.

Table S1. Change percentage of extreme climate indices at different landscapes types in 2020, 2050 and 2100 under different emission scenarios at Zhousui River watershed compared with baseline value (2020)

ZRW	2050				2100			
	W	L	U	F	W	L	U	F
CDD (%)								
SSP1-2.6	-10.0	-26.8	-28.9	4.00	-6.70	-35.2	-26.3	8.00
SSP2-4.5	20.0	-42.3	0.00	36.0	-20.0	-60.6	-28.9	-12.0
SSP5-8.5	33.3	-15.5	18.4	36.0	170	43.7	145	188
CWD (%)								
SSP1-2.6	9.09	140	40.0	-7.69	-9.09	140	30.0	-7.69
SSP2-4.5	9.09	60.0	20.0	-7.69	-9.09	60.0	0.00	-15.4
SSP5-8.5	0.00	100	10.0	-15.4	18.2	160	40.0	0.00
R95p (mm)								
SSP1-2.6	892.6	897.0	709.0	990.5	584.9	274.4	547.2	627.0
SSP2-4.5	260.8	0.000	112.0	346.5	1785	986.4	1699	1889
SSP5-8.5	1155	581.7	1127	1216	1355	1258	1442	1325
R99p (mm)								
SSP1-2.6	2069	666.7	1919	2163	1770	1320	1773	1820
SSP2-4.5	1324	800.3	1172	1436	3535	2552	3625	3588
SSP5-8.5	2243	1846	2371	2223	2396	2629	2634	2250
TNx (%)								
SSP1-2.6	29.8	0.64	5.63	42.6	21.9	-1.50	3.82	31.6
SSP2-4.5	44.1	11.3	18.5	57.9	40.8	9.86	16.8	53.7
SSP5-8.5	44.6	14.6	18.6	58.3	60.2	18.9	30.2	76.6
TXx (%)								
SSP1-2.6	22.3	1.36	1.66	33.0	15.8	1.00	2.81	22.7
SSP2-4.5	17.7	1.71	4.68	24.7	16.4	4.51	4.10	22.7
SSP5-8.5	18.9	4.33	3.86	26.5	24.9	10.6	9.84	32.5

W: whole area; L: lowlands; U: uplands; F: forested areas;

CDD: Consecutive dry days; CWD: Consecutive wet days;

R95p: Very wet-day precipitation; R99p: Extremely wet day precipitation;

TNn: minimum value of daily minimum temperature; TXx: maximum value of daily maximum temperature

Table S2. Change percentage of extreme climate indices at different landscapes types in 2020, 2050 and 2100 under different emission scenarios at Zhousui River watershed compared with baseline value (2020)

LRW	2050				2100			
	W	L	U	F	W	L	U	F
CDD (%)								
SSP1-2.6	-3.70	38.2	-9.70	-8.00	22.2	52.9	22.6	16.0
SSP2-4.5	40.7	20.6	29.0	44.0	-7.41	-14.7	-16.1	-4.00
SSP5-8.5	74.1	70.6	71.0	72.0	211	147	174	236
CWD (%)								
SSP1-2.6	44.4	30.0	85.7	20.0	44.4	-20.0	85.7	30.0
SSP2-4.5	44.4	20.0	85.7	30.0	22.2	10.0	57.1	10.0
SSP5-8.5	22.2	30.0	42.9	20.0	33.3	-20.0	71.4	30.0
R95p (mm)								
SSP1-2.6	1326	1358	1137	1491	139.1	0.000	12.24	211.1
SSP2-4.5	68.13	0.000	0.000	106.5	1096	452.5	1083	1142
SSP5-8.5	704.4	106.7	460.7	863.6	576.6	0.000	256.3	772.8
R99p (mm)								
SSP1-2.6	2865	203.8	2917	2904	1574	904.4	1581	1635
SSP2-4.5	1475	1335	1601	1422	3744	3921	4169	3525
SSP5-8.5	2404	2318	2390	2414	2195	1433	2203	2242
TNx (%)								
SSP1-2.6	32.9	7.61	4.95	48.5	1.43	-0.98	3.72	0.44
SSP2-4.5	46.9	6.90	17.7	64.1	45.5	2.59	16.4	62.6
SSP5-8.5	50.3	13.4	19.9	67.8	63.1	15.2	29.5	83.0
TXx (%)								
SSP1-2.6	20.6	5.01	0.76	31.5	15.4	-3.59	-0.48	24.5
SSP2-4.5	17.5	5.15	0.83	26.6	17.2	1.40	0.04	26.8
SSP5-8.5	20.1	3.59	2.20	30.0	24.1	0.57	5.70	34.7

W: whole area; L: lowlands; U: uplands; F: forested areas;
CDD: Consecutive dry days; CWD: Consecutive wet days;
R95p: Very wet-day precipitation; R99p: Extremely wet day precipitation;
TNn: minimum value of daily minimum temperature; TXx: maximum value of daily maximum temperature