

Table S1. CGLUE factors values of 11 counties in 2010

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	4022	243	265	351	748	802	439	403	371	408	335
Administrative area (sq.km)	12000	4000	7000	12000	6000	20000	16000	5000	7000	13000	15000
Number of employed persons in secondary and tertiary industries (10 000 persons)	587	113	43	124	118	169	76	88	85	155	48
GDP in secondary and tertiary industries (100 million yuan)	4235	461	404	487	647	663	198	311	368	597	195
Average wage of staff and workers (yuan)	26877	20932	26561	20259	24998	22537	21754	19783	19646	23236	20410
Basic statistics on per capita park green area (hectare)	4	2	4	1	1	1	1	1	1	1	1
Carbon emissions of land	3014986	1225430	10215432	4994402	1073239	1701455	1627140	573320	931160	3970495	493851
Volume of industrial wastewater discharged (10000 tons)	24553	2329	1771	6522	5372	9781	2790	3095	4238	11143	1514
Volume of industrial sulphur dioxide emission (ton)	93045	33321	102724	83707	20016	43758	32153	8089	17298	80954	5487
Volume of industrial soot (dust) emission (ton)	36670	5676	6293	8098	3959	19468	13712	7089	27103	7641	2993

Table S2. CGLUE factors values of 11 counties in 2011

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	4255	320	331	460	601	821	480	495	420	534	371
Administrative area (sq.km)	12000	4000	7000	12000	6000	20000	16000	5000	7000	13000	15000
Number of employed persons in secondary and tertiary industries (10 000 persons)	614	110	44	127	115	165	80	93	92	156	51
GDP in secondary and tertiary industries (100 million yuan)	5266	563	503	606	769	794	245	386	448	737	237
Average wage of staff and workers (yuan)	30515	23223	30029	22448	28355	26347	25328	22621	22897	25265	23065
Basic statistics on per capita park green area (hectare)	4	3	4	2	1	2	1	1	1	1	3
Carbon emissions of land	3193887	1225430	12865528	5742445	1107081	2459194	1967331	635273	931160	4564499	493851
Volume of industrial wastewater discharged (10000 tons)	12558	2781	1904	6267	5448	9492	2783	3560	10409	12256	1943
Volume of industrial sulphur dioxide emission (ton)	61928	36611	100568	91275	22641	46081	35365	10989	20818	86786	6652
Volume of industrial soot (dust) emission (ton)	28901	13556	25025	9014	5332	19843	19667	1392	28201	7550	2786

Table S3. CGLUE factors values of 11 counties in 2012

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	4996	353	383	524	650	881	498	536	450	607	341
Administrative area (sq.km)	12000	4000	7000	12000	6000	20000	16000	5000	7000	13000	15000
Number of employed persons in secondary and tertiary industries (10 000 persons)	640	117	49	128	124	172	81	94	93	161	54
GDP in secondary and tertiary industries (100 million yuan)	6623	681	621	770	960	990	320	462	552	928	293
Average wage of staff and workers (yuan)	34008	27975	35997	27053	32325	31717	30548	27316	27782	30068	28061
Basic statistics on per capita park green area (hectare)	4	3	5	2	1	2	2	1	1	2	1
Carbon emissions of land	4192788	1225430	13935183	5769430	1015906	2644835	2168895	681691	931160	6082109	831120
Volume of industrial wastewater discharged (10000 tons)	12904	2540	2272	3513	6914	9625	1197	1794	2924	7613	1758
Volume of industrial sulphur dioxide emission (ton)	108723	42410	130898	172233	104563	100727	26359	10327	29959	173926	38712
Volume of industrial soot (dust) emission (ton)	22227	10000	52938	13918	13536	17033	26821	4396	26079	21269	1047526

Table S4. CGLUE factors values of 11 counties in 2013

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	5890	435	463	671	731	932	515	655	602	749	357
Administrative area (sq.km)	12119	4381	7401	12236	5910	20248	16311	5323	7140	13266	15046
Number of employed persons in secondary and tertiary industries (10 000 persons)	649	122	45	129	126	181	79	98	91	172	63
GDP in secondary and tertiary industries (100 million yuan)	7791	775	714	887	1086	1127	377	532	639	1061	338
Average wage of staff and workers (yuan)	38221	32681	40846	31340	36684	35544	34030	30641	33034	34670	32837
Basic statistics on per capita park green area (hectare)	4	4	5	2	1	2	2	2	1	2	2
Carbon emissions of land	3515895	1225430	12757354	4088415	1038074	2410636	2176126	546917	931160	7018714	557146
Volume of industrial wastewater discharged (10000 tons)	11780	2293	4011	3707	6386	6798	399	1529	6448	8404	1028
Volume of industrial sulphur dioxide emission (ton)	122398	31875	151074	176307	107505	89467	21111	11598	0	378325	46678
Volume of industrial soot (dust) emission (ton)	3484497	262709	2549668	1211492	935899	2382433	1124212	42759	798109	2522831	696818

Table S5. CGLUE factors values of 11 counties in 2014

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	6501	532	546	866	807	1001	541	805	756	935	353
Administrative area (sq.km)	12119	4381	7401	12236	5910	20248	16311	5323	7140	13266	15046
Number of employed persons in secondary and tertiary industries (10 000 persons)	683	128	51	141	137	191	81	100	91	164	59
GDP in secondary and tertiary industries (100 million yuan)	8756	882	773	985	1201	1216	424	604	715	1144	355
Average wage of staff and workers (yuan)	48358	37081	44220	37648	41426	40989	37300	34633	36595	38674	35464
Basic statistics on per capita park green area (hectare)	4	4	5	2	1	2	2	2	1	2	2
Carbon emissions of land	2999207	2126350	13744122	2630862	997221	2257709	545796	443891	931160	6396313	443034
Volume of industrial wastewater discharged (10000 tons)	10524	1828	4138	3541	6638	5788	364	1111	3974	5825	1168
Volume of industrial sulphur dioxide emission (ton)	115512	36539	158621	170305	32474	82086	20930	12024	23245	450541	42476
Volume of industrial soot (dust) emission (ton)	2342401	184645	2663186	1065674	809035	2232063	1015843	41907	535926	2492645	261206

Table S6. CGLUE factors values of 11 counties in 2015

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	6620	598	617	1181	895	1080	562	914	923	1130	471
Administrative area (sq.km)	12119	4381	7401	12236	5910	20248	16311	5323	7140	13266	15046
Number of employed persons in secondary and tertiary industries (10 000 persons)	691	130	51	141	140	195	85	101	100	167	57
GDP in secondary and tertiary industries (100 million yuan)	9700	952	842	1100	1316	1332	470	673	796	1237	396
Average wage of staff and workers (yuan)	51681	40162	50221	41121	44169	44640	41518	37894	41161	40978	39548
Basic statistics on per capita park green area (hectare)	5	4	5	2	2	2	2	2	2	2	2
Carbon emissions of land	2623678	1601336	14146851	2471258	929363	1978715	2766723	3471029	931160	6396313	387264
Volume of industrial wastewater discharged (10000 tons)	10064	1684	2553	3084	6506	5614	329	1478	3974	8560	967
Volume of industrial sulphur dioxide emission (ton)	146175	28211	200429	143651	31331	77144	19221	12147	22648	451583	38178
Volume of industrial soot (dust) emission (ton)	2342401	184645	2663186	1065674	809035	2232063	1015843	41907	535926	2492645	261206

Table S7. CGLUE factors values of 11 counties in 2016

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	7007	639	645	1464	981	1154	583	1012	1032	1296	531
Administrative area (sq.km)	12119	4381	7401	12236	5910	20248	16311	5323	7140	13266	15046
Number of employed persons in secondary and tertiary industries (10 000 persons)	725	116	43	145	142	207	93	89	101	169	52
GDP in secondary and tertiary industries (100 million yuan)	10428	1015	894	1186	1397	1440	506	774	870	1310	430
Average wage of staff and workers (yuan)	57480	43157	51999	44749	48090	49817	46888	42188	45379	46019	42533
Basic statistics on per capita park green area (hectare)	5	4	6	3	2	3	2	2	2	2	2
Carbon emissions of land	2332916	1608108	13361590	2216075	874611	1582021	3104685	258020	1598479	5306109	427514
Volume of industrial wastewater discharged (10000 tons)	11454	1693	2432	3745	5411	6890	407	1419	6402	22125	815
Volume of industrial sulphur dioxide emission (ton)	116920	21396	139682	129549	33314	67169	24182	11414	27932	320138	29647
Volume of industrial soot (dust) emission (ton)	1389828	235581	1610717	333124	1118702	2255500	512383	40815	363770	2405613	85572

Table S8. CGLUE factors values of 11 counties in 2017

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	8371	710	696	1730	1125	1270	618	1126	1164	1465	551
Administrative area (sq.km)	14335	4381	7401	12236	5910	20248	16311	5323	7140	13266	15046
Number of employed persons in secondary and tertiary industries (10 000 persons)	769	104	43	151	145	213	94	91	104	171	53
GDP in secondary and tertiary industries (100 million yuan)	11695	1098	980	1304	1533	1550	554	855	948	1421	469
Average wage of staff and workers (yuan)	61330	46595	55508	47871	52249	53222	51379	45840	48293	49966	46458
Basic statistics on per capita park green area (hectare)	6	4	6	3	2	3	2	2	2	2	2
Carbon emissions of land	2332916	1283120	12669043	2237995	740290	1411438	2495142	258020	1009849	5411498	444837
Volume of industrial wastewater discharged (10000 tons)	9262	1262	0	3050	4191	2576	332	1373	0	0	634
Volume of industrial sulphur dioxide emission (ton)	67877	13310	0	95822	25742	18356	7953	11561	0	0	39439
Volume of industrial soot (dust) emission (ton)	1417322	326949	0	176417	1014595	843411	245459	41896	0	0	230128



Table S9. CGLUE factors values of 11 counties in 2018

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	9404	832	745	2042	1311	1437	715	1258	1111	1685	461
Administrative area (sq.km)	14335	4381	7401	12236	5910	20248	16311	5323	7140	13266	15046
Number of employed persons in secondary and tertiary industries (10 000 persons)	785	105	44	148	143	215	96	94	105	174	54
GDP in secondary and tertiary industries (100 million yuan)	13389	1169	1107	1413	1732	1783	619	978	1007	1608	522
Average wage of staff and workers (yuan)	65098	52339	61005	52455	56815	56966	54086	49962	52410	54195	48895
Basic statistics on per capita park green area (hectare)	7	4	7	4	2	3	2	2	2	3	2
Carbon emissions of land	2148573	713462	8811305	2282775	759155	1405210	2324616	183753	729761	4357784	486632
Volume of industrial wastewater discharged (10000 tons)	8319	929	0	3405	0	0	222	0	2542	6107	0
Volume of industrial sulphur dioxide emission (ton)	0	2833	0	12752	0	0	4251	0	10390	26733	0
Volume of industrial soot (dust) emission (ton)	0	2178	0	6508	0	0	3519	0	7937	7739	0

Table S10. CGLUE factors values of 11 counties in 2019

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	11182	856	760	2114	1439	1686	851	1436	1193	1835	502
Administrative area (sq.km)	14335	4381	7401	12236	5910	20248	16311	5323	7140	13266	15046
Number of employed persons in secondary and tertiary industries (10 000 persons)	792	107	44	151	145	218	98	95	107	177	56
GDP in secondary and tertiary industries (100 million yuan)	14820	1255	1134	1504	1971	2003	684	1056	1070	1778	560
Average wage of staff and workers (yuan)	71300	56040	65124	58614	62612	63500	58362	56261	59325	62126	53231
Basic statistics on per capita park green area (hectare)	7	5	7	5	2	3	3	3	2	4	2
Carbon emissions of land	2054936	592093	7153572	2391348	756264	1545576	2239067	148164	687049	3815252	408881
Volume of industrial wastewater discharged (10000 tons)	7911	867	4668	3993	3494	1428	511	1060	0	5900	566
Volume of industrial sulphur dioxide emission (ton)	7741	1832	44895	11033	6334	6970	3223	1404	0	22442	3955
Volume of industrial soot (dust) emission (ton)	8541	1321	35016	5285	7185	12185	3806	737	0	9990	3634

Table S11. CGLUE factors values of 11 counties in 2020

Factor	Chengdu	Zigong	Panzhihua	Luzhou	Deyang	Mianyang	Guangyuan	Suining	Meishan	Yibin	Yaan
Total investment in fixed assets by region	12099	1011	856	2302	1590	1872	971	1640	1170	2059	572
Administrative area (sq.km)	14335	4381	7401	12236	5910	20248	16311	5323	7140	13266	15046
Number of employed persons in secondary and tertiary industries (10 000 persons)	811	109	44	153	147	220	98	100	109	176	57
GDP in secondary and tertiary industries (100 million yuan)	16400	1226	918	1864	2101	2554	789	1161	1181	2324	596
Average wage of staff and workers (yuan)	79664	56719	68016	61868	63585	63700	63544	59290	62444	66048	62179
Basic statistics on per capita park green area (hectare)	7	5	7	5	3	4	3	3	3	4	3
Carbon emissions of land	1868504	653544	6836825	2302312	739713	1701455	2208941	113330	630663	1822274	458228
Volume of industrial wastewater discharged (10000 tons)	9290	1051	4912	4192	3579	1922	670	1254	1651	6586	786
Volume of industrial sulphur dioxide emission (ton)	6104	1356	44828	10354	5550	4579	2448	1958	6904	13038	3693
Volume of industrial soot (dust) emission (ton)	8925	2367	34992	5251	5947	9472	3777	1651	6269	10465	3322

Table S12. 11 Counties CGLUE from 2010 to 2020

County	Year	CGLUE	County	Year	CGLUE	County	Year	CGLUE	County	Year	CGLUE	County	Year	CGLUE
Chengdu	2010	1.273	Panzhihua	2013	1.931	Deyang	2015	1.226	Guangyuan	2017	1.210	Meishan	2019	1.000
Chengdu	2011	1.160	Panzhihua	2014	1.713	Deyang	2016	1.098	Guangyuan	2018	0.735	Meishan	2020	0.942
Chengdu	2012	1.369	Panzhihua	2015	1.786	Deyang	2017	1.101	Guangyuan	2019	0.808	Yibin	2010	0.703
Chengdu	2013	1.543	Panzhihua	2016	2.104	Deyang	2018	1.000	Guangyuan	2020	1.000	Yibin	2011	1.007
Chengdu	2014	1.656	Panzhihua	2017	1.991	Deyang	2019	1.002	Suining	2010	1.624	Yibin	2012	0.694
Chengdu	2015	1.995	Panzhihua	2018	2.145	Deyang	2020	1.035	Suining	2011	1.161	Yibin	2013	0.664
Chengdu	2016	1.940	Panzhihua	2019	1.937	Mianyang	2010	0.533	Suining	2012	1.000	Yibin	2014	0.652
Chengdu	2017	1.528	Panzhihua	2020	1.982	Mianyang	2011	0.559	Suining	2013	1.000	Yibin	2015	0.610
Chengdu	2018	2.434	Luzhou	2010	0.674	Mianyang	2012	0.583	Suining	2014	1.000	Yibin	2016	0.588
Chengdu	2019	1.648	Luzhou	2011	0.685	Mianyang	2013	0.601	Suining	2015	1.000	Yibin	2017	1.000
Chengdu	2020	1.095	Luzhou	2012	0.697	Mianyang	2014	0.605	Suining	2016	1.011	Yibin	2018	0.566
Zigong	2010	2.215	Luzhou	2013	0.679	Mianyang	2015	0.615	Suining	2017	1.000	Yibin	2019	0.601
Zigong	2011	2.156	Luzhou	2014	0.670	Mianyang	2016	0.605	Suining	2018	1.000	Yibin	2020	0.739
Zigong	2012	1.869	Luzhou	2015	0.643	Mianyang	2017	0.575	Suining	2019	1.000	Yaan	2010	1.000
Zigong	2013	2.036	Luzhou	2016	0.589	Mianyang	2018	0.765	Suining	2020	1.000	Yaan	2011	1.011
Zigong	2014	2.086	Luzhou	2017	0.622	Mianyang	2019	0.595	Meishan	2010	0.983	Yaan	2012	1.441
Zigong	2015	1.552	Luzhou	2018	0.538	Mianyang	2020	1.021	Meishan	2011	0.952	Yaan	2013	1.357
Zigong	2016	1.966	Luzhou	2019	0.553	Guangyuan	2010	0.772	Meishan	2012	1.041	Yaan	2014	1.650
Zigong	2017	2.649	Luzhou	2020	0.658	Guangyuan	2011	0.808	Meishan	2013	1.033	Yaan	2015	1.000
Zigong	2018	2.535	Deyang	2010	1.683	Guangyuan	2012	1.000	Meishan	2014	1.041	Yaan	2016	1.202
Zigong	2019	1.951	Deyang	2011	1.208	Guangyuan	2013	1.000	Meishan	2015	1.014	Yaan	2017	1.349
Zigong	2020	1.119	Deyang	2012	1.221	Guangyuan	2014	1.000	Meishan	2016	0.874	Yaan	2018	1.602

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