

Table S1 The data of rice data in Hunan Province in 2019

Type	Sown area/10 <sup>3</sup> ha	Yield/(kg ha <sup>-1</sup> )	Production/t
Early rice	1217.578673	5952.815419	7248021.1
Single-season rice	1477.631467	7431.479193	10980987.5
Late rice	1284.82574	6458.117659	8297555.8

Table S2 The data of rice sown area and yield in different cities in 2019

Cities	Sown area/10 <sup>3</sup> ha	Yield/(kg ha <sup>-1</sup> )	Production/t
Changsha	289.57	6842.832476	1981479
Chenzhou	240.58794	6333.605084	1523789
Shaoyang	411.369	6548.940246	2694031
Xiangxi	95.7528	6205.969956	594239
Yueyang	438.13	6340.966152	2778167.5
Changde	496.37	6602.84848	3277455.9
Hengyang	465.75063	6704.693024	3122715
Huaihua	211.2067	7151.203063	1510382
Loudi	180.69	6981.803088	1261542
Xiangtan	164.35	7274.77335	1195609
Yiyang	339.3552	6494.761241	2204031
Yongzhou	379.23	6565.588165	2489868
Zhuzhou	211.47921	7281.11761	1539805
Zhangjiajie	56.1944	6289.790441	353451

Table S3 The data of rice sown area and yield with different type in Hunan Province in 2019

Cities	Early rice			Single-season rice			Late rice		
	Sown area/10 <sup>3</sup> ha	Yield/(kg ha <sup>-1</sup> )	Production/t	Sown area/10 <sup>3</sup> ha	Yield/(kg ha <sup>-1</sup> )	Production/t	Sown area/10 <sup>3</sup> ha	Yield/(kg ha <sup>-1</sup> )	Production/t
Changsha	99.76	5730	571785	85.88	7830	673069	103.93	7095	736625
Chenzhou	68.99027	0	395247	99.493	0	686965	72.10467	0	441577
Shaoyang	119.5319	5520	692024	164.2447	8160	1234584	127.5924	6705	767423
Xiangxi		6000		95.7528	7905	594239		7680	
Yueyang	167.08	5295	946278	89.01	6420	701344.5	182.04	6420	1130545
Changde	150.38	0	859405.1	187.34	7665	1432524	158.65	0	985526.8
Hengyang	182.2746	6075	1117163	90.46133	8100	714372	193.0147	7245	1291180
Huaihua		6090		211.2067	7890	1510382		6945	
Loudi	54.78	5775	363020	67.99	7920	519353	57.92	7200	379169
Xiangtan	60.7	5250	402905	40.46	7680	343081	63.19	7050	449623
Yiyang	110.7619	5729.025544	637450	110.5196	6904.656609	802647	118.0737	6124.111246	763934
Yongzhou	131.2	5027.49577	777873	113.97	6049.496208	886233	134.06	6188.229126	825762
Zhuzhou	71.04467	4925.677605	479111	67.28127	6469.03752	540859	73.15327	6478.159522	519835
Zhangjiajie	1.075333333	5356.478611	5760	54.02206667	6318.43654	341335	1.097	5793.983592	6356