Supplementary Materials

Table S1. Activity data description of agricultural carbon emission

Category	Indicator	Data Source	Reference
Energy consumption	Amount of coal, coke, crude oil, gasoline, kerosene, diesel oil, fuel oil, electric power and natural gas used in agricultural production	China Energy Statistics Yearbook	[1]
Farmland utilization	Application amount of fertilizers, pesticides, and agricultural film, plowing area	China Rural Statistical Yearbook	[2]
Crop planting	Planting areas of rice, wheat, corn, soybeans, and vegetable		
Ruminant feeding	Annual average stock of cattle, horses, donkeys, mules, pigs, goats and sheep		
Straw burning.	Yield of rice, wheat, corn, soybeans, cotton and canola		

Table S2. Input-output indicators

Indicator types	Indicator name	Data source	Reference
The output indicator	Agricultural carbon emission intensity	Table S1	[1, 2]
The input indicator	Gross agricultural output	China Rural Statistical Yearbook	[2]
	Agricultural population		
	The amount of agricultural chemical fertilizers, pesticides, and agricultural film		
	Total sown area of crops		
	Total power of agricultural machinery		

Table S3. Share of agricultural carbon emissions by region in the total national agricultural carbon emissions in 2020

Eastern Region	Percentage Rate	Middle Region	Percentage Rate	Western Region	Percentage Rate
Beijing	0.17%	Shanxi	2.13%	Chongqing	1.44%
Tianjin	0.46%	Inner Mongolia	5.36%	Sichuan	5.54%
Hebei	4.89%	Jilin	4.13%	Guizhou	2.20%
Liaoning	3.55%	Heilongjiang	8.26%	Yunnan	4.13%
Shanghai	0.24%	Anhui	4.57%	Shaanxi	2.14%
Jiangsu	4.64%	Jiangxi	3.09%	Gansu	2.49%
Zhejiang	1.75%	Henan	8.09%	Qinghai	1.03%
Fujian	1.39%	Hubei	4.37%	Ningxia	0.79%
Shandong	6.64%	Hunan	5.17%	Xinjiang	4.45%
Guangdong	3.43%	Guangxi	2.85%		
Hainan	0.62%				

Table S4. Regression results of the effect of industrial structure on its agricultural carbon intensity

Eastern Region	Coef	Middle Region	Coef	Western Region	Coef
Beijing	1.34***(15.20)	Anhui	-7.80***(-3.92)	Chongqing	2.02*(1.70)
Hebei	-3.06**(-2.38)	Henan	-3.65*(-1.85)	Xinjiang	-4.40***(-4.80)

Table S5. Regression results of the effect of agricultural technical progress on its agricultural carbon intensity

Eastern Region	Coef	Middle Region	Coef	Western Region	Coef
Beijing	-0.30***(-6.08)	Shanxi	0.35**(2.23)	Chongqing	0.58**(2.39)
		Inner Mongolia	0.35**(1.70)	Yunnan	0.50***(2.73)
		Jilin	0.90***(3.77)	Qinghai	0.50**(2.46)
		Heilongjiang	0.56**(2.33)	Xinjiang	1.28***(7.15)
		Jiangxi	0.63***(3.56)		
		Henan	0.45**(1.97)		

Table S6. Regression results of the effect of environmental governance strength on its agricultural carbon intensity

Eastern Region	Coef	Middle Region	Coef	Western Region	Coef
Beijing	-0.14***(-3.51)	Anhui	-0.12*(-1.85)	Shaanxi	-0.11*(-1.78)
Shanghai	0.24***(4.65)	Hunan	-0.11*(-1.71)	Xinjiang	-0.14***(-3.52)
		Guangxi	-0.14**(-2.01)		

Table S7. Regression results of the effect of agricultural population on its agricultural carbon intensity

Eastern Region	Coef	Middle Region	Coef	Western Region	Coef
Beijing	1.26***(6.92)	Inner Mongolia	-1.47**(-2.10)	Qinghai	-1.67***(-2.66)
Liaoning	-0.54***(-3.53)	Jilin	-1.46***(-2.73)	Ningxia	-1.28*(-1.92)
Hainan	2.74***(3.51)	Heilongjiang	-1.39**(-2.46)	Xinjiang	-2.85***(-3.91)
		Anhui	2.05**(2.12)		

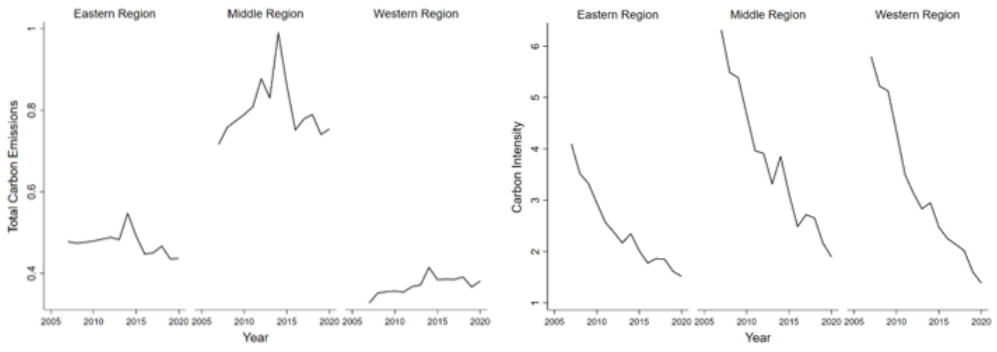

Fig. S1. The chart of regional differences in total carbon emissions and carbon intensity

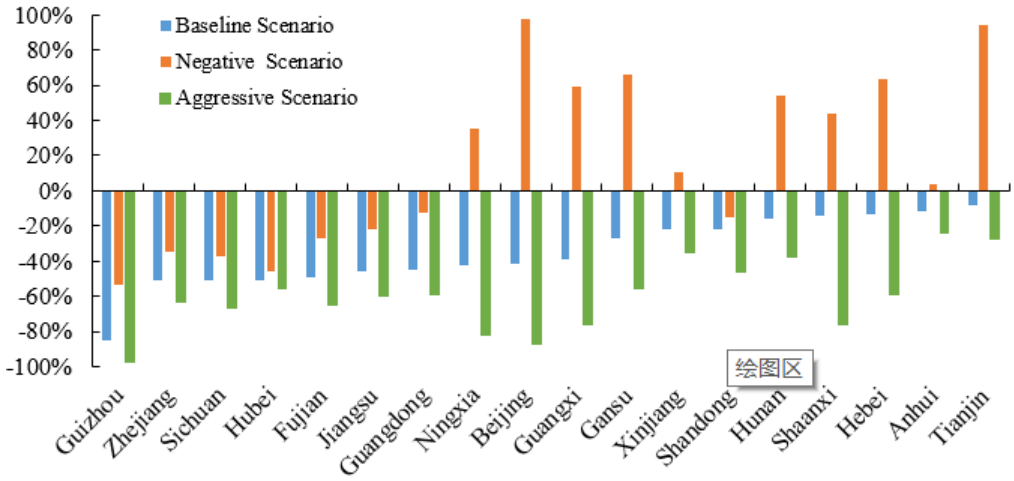

Fig. S2. Carbon intensity reduction rate in economy-led regions in 2030

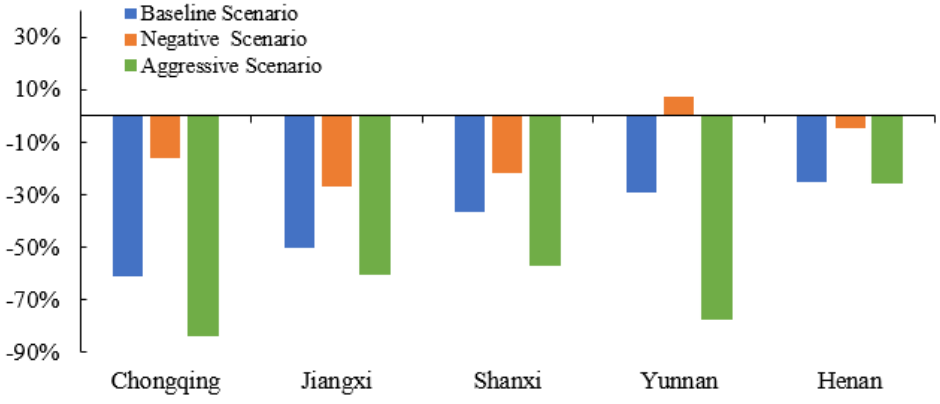

Fig. S3. Carbon intensity reduction rate in technology-led regions in 2030

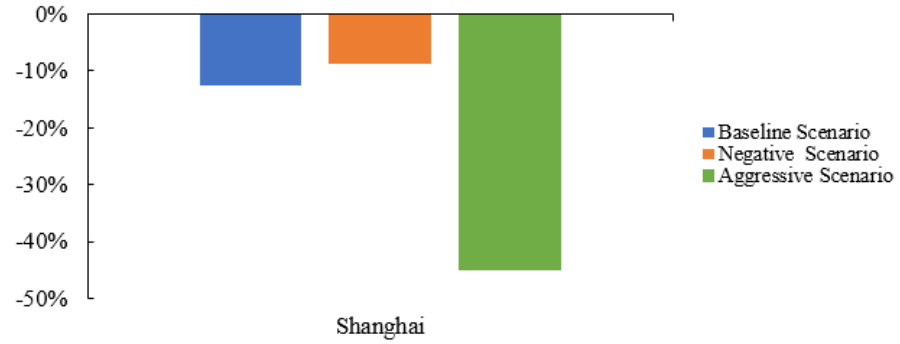

Fig. S4. Carbon intensity reduction rate in policy-led regions in 2030

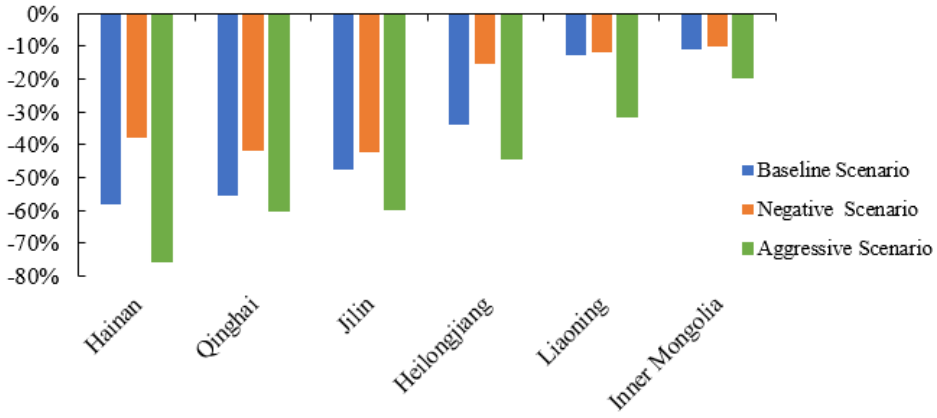

Fig. S5. Carbon intensity reduction rate in population-led regions in 2030

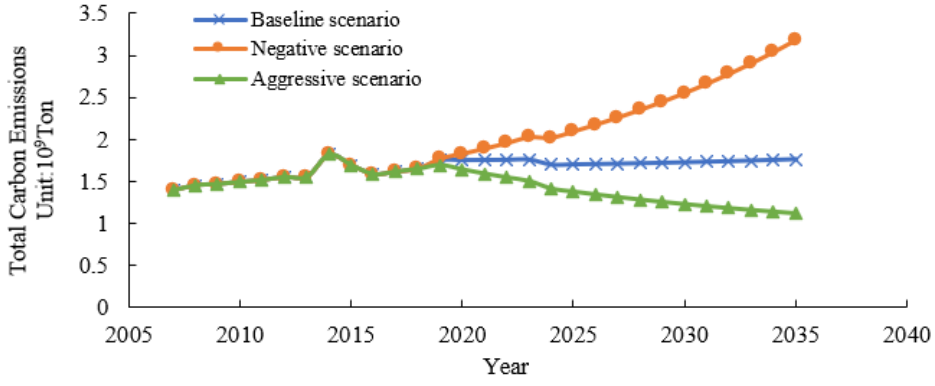

Fig. S6. Change chart of total carbon emissions under each scenario

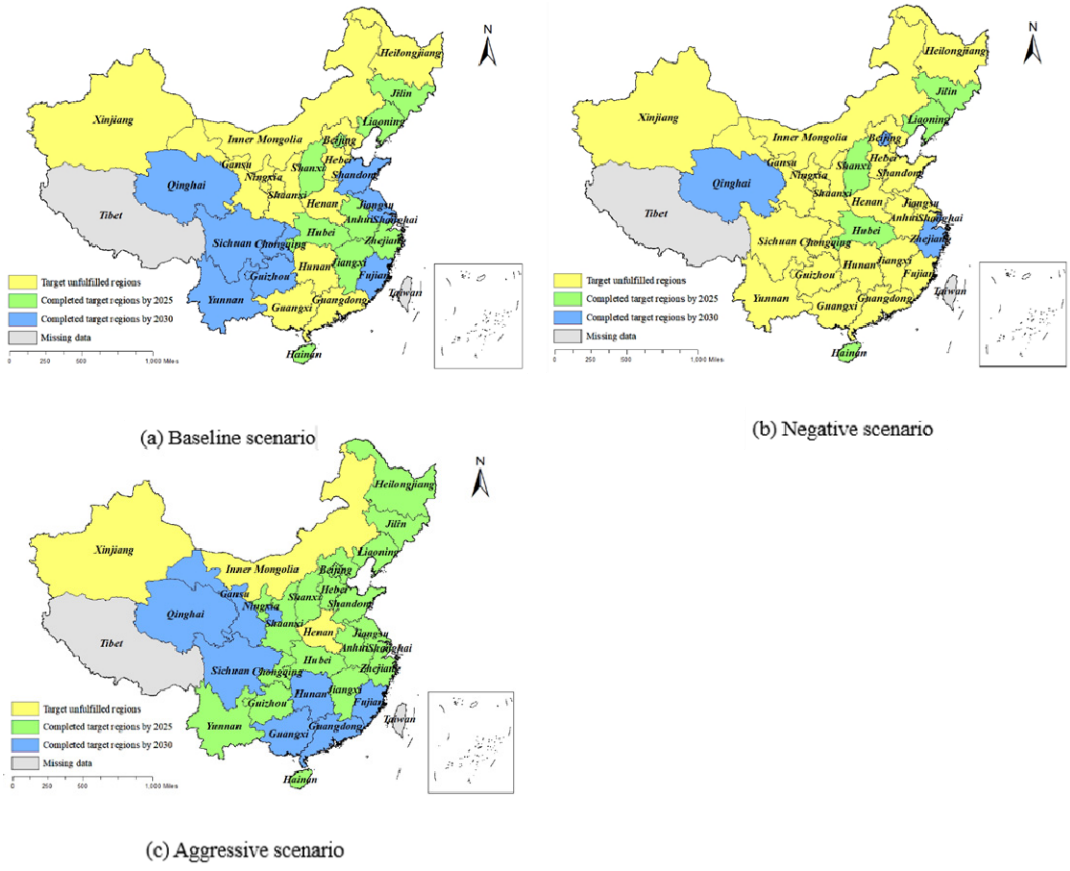

Fig. S7. Comparison of peak attainment in each scenario

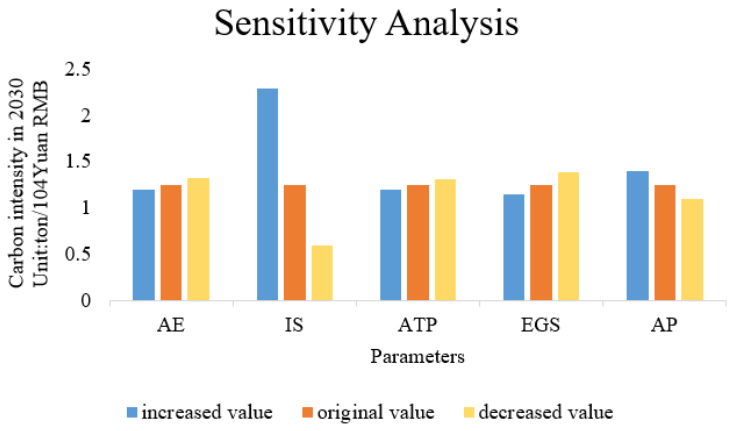

Fig. S8. Sensitivity Analysis

References

1. Department of Energy Statistics, National Bureau of Statistics of China. China Energy Statistics Yearbook. China: Statistics Press; 2023.
2. National Bureau of Statistics of China. China Rural Statistical Yearbook. China: Statistics Press; 2023.