Triple benefits of repositioning agricultural support policy to promote the sustainable transformation of agri-food systems

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➢ Introduction

- The agri-food systems are a major driver of global climate change.
- Agricultural support policies are an important tool for reducing GHG emissions and achieving sustainable transformation of agri-food systems.
- Repositioning agricultural support policies to facilitate the sustainable transformation of agri-food systems has become a priority topic in globally as well as China.
- Agricultural green and low-carbon technologies comprise an important measure for achieving GHG emissions reduction in agri-food systems.

➢ Objectives

- In this study, the China Agricultural University Agri-food Systems (CAU-AFS) model is used to analyze the impact of different agricultural green and low-carbon technology scenarios on future GHG emissions of agri-food systems and food security, and to compare their economic returns.

➢ Data

- Data come from some publicly available databases, such as FAOSTAT. It also includes China Statistical Yearbook published by the National Bureau of Statistics (NBSC).
- In addition, in this study, the parameters of the agricultural green and low-carbon technologies, such as costs and effectiveness, are collected from previous literature.

➢ Model

- The China Agricultural University Agri-food Systems Model, named CAU-AFS model, was developed by China Agricultural University. It combines two core models: the China Agricultural Spatial Equilibrium Model and the China Computable General Equilibrium Model.
- For this analysis, we mainly apply the China CGE model and its GHG emission module to jointly simulate the impact of agricultural support policy adjustment options on food security, carbon emissions, and economic growth.

➢ Scenarios

- Scenario 0: Baseline—No policy changes.
- Scenario 1a: Green and low-carbon technology in planting—Fertilizer reduction.
- Scenario 1b: Green and low-carbon technology in planting—Rice emissions reduction.
- Scenario 1c: Green and low-carbon technology in livestock.

➢ Results

Scenario 1a

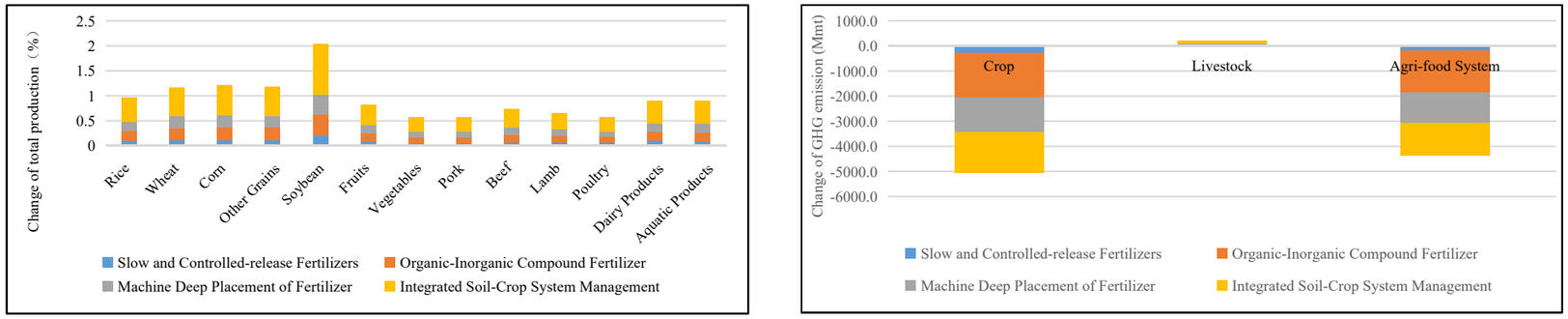


Fig. 1 | Impact of fertilizer reduction technology—Medium scenario for 2030. A, impact on food security. B, impact on GHG emissions.
Source: CAU-AFS model results.

Scenario 1b and Scenario 1c

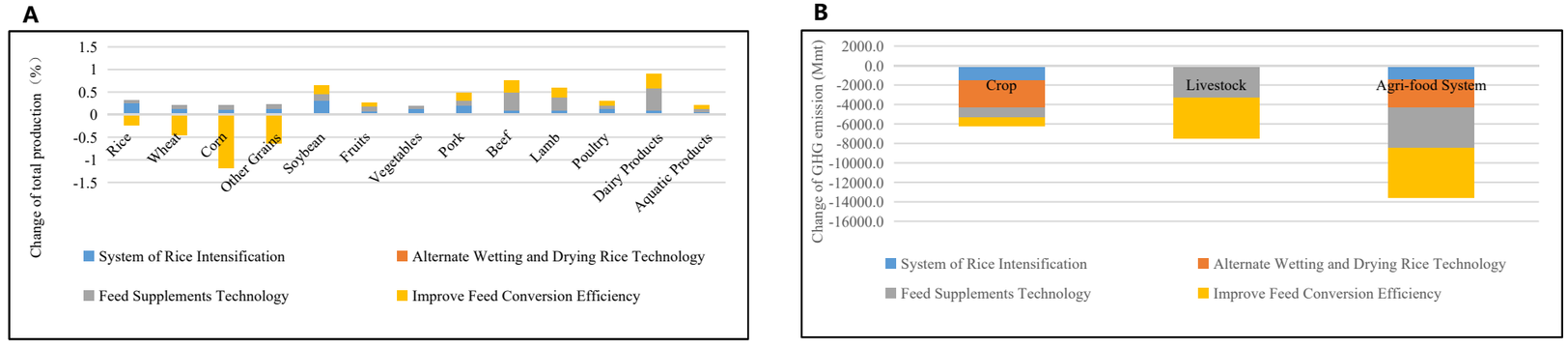
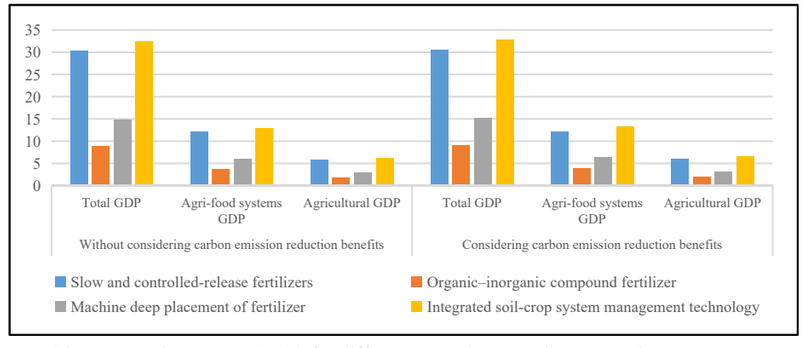


Fig. 2 | Impact of green and low-carbon technologies for rice emissions reduction and livestock—Medium scenario for 2030. A, impact on food security. B, impact on GHG emissions.
Source: CAU-AFS model results.

Scenario 1a



Scenario 1b and Scenario 1c

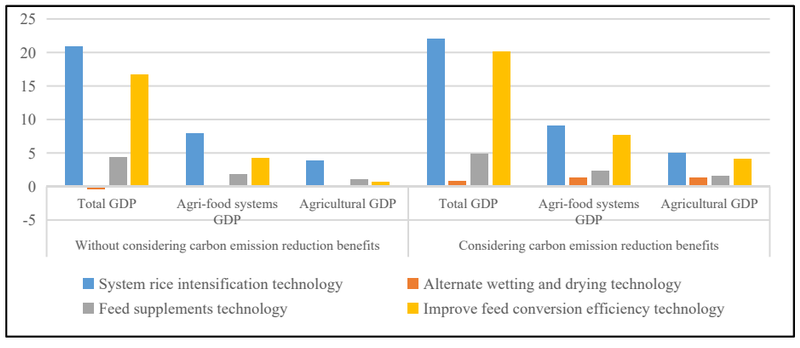


Fig. 3 | Return on investment (ROI) for different scenarios—Medium scenario.
Source: CAU-AFS model results.

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➢ Conclusions

- Previous agricultural support policies have led to great achievements in China's agriculture.
- Repositioning agricultural support policies, investing in green and low-carbon technologies in agriculture and promoting their application in agriculture can achieve triple benefits for food security, the environment and the economy.

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