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China's Rice Agriculture in Resilience Adaption to Climate Change

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CAST Side Event, 12-05

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Rice Agriculture of China:

Productivity and climate change mitigation significance

Total croplands: 140Mha;

Rice paddies : 30Mha

China State Statistics, 2006

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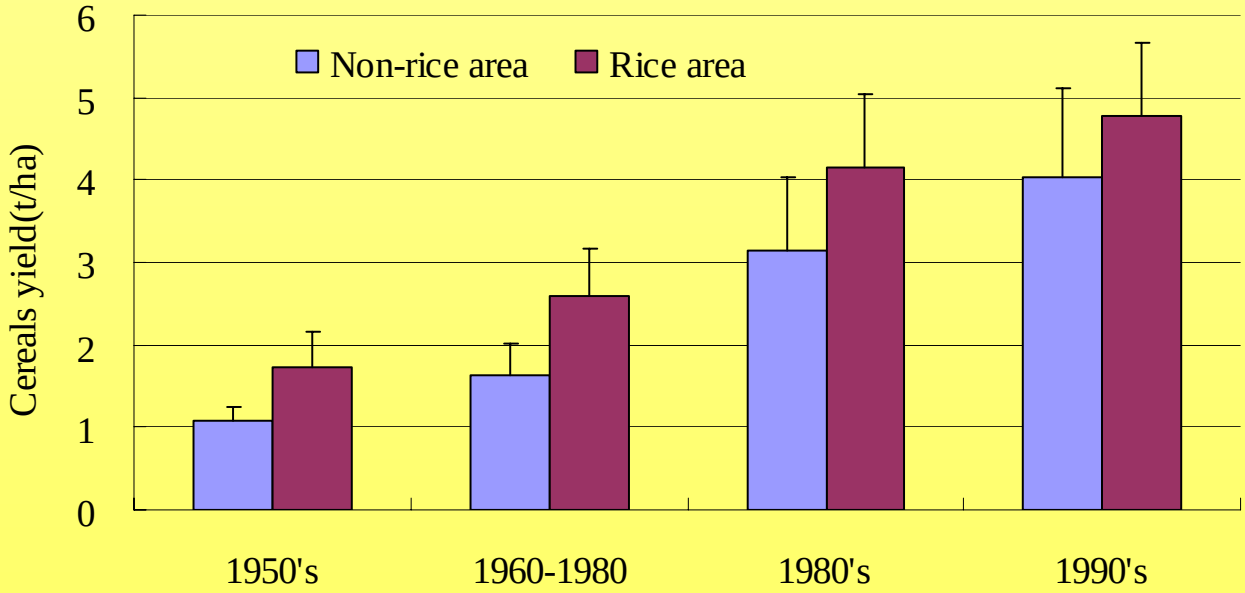
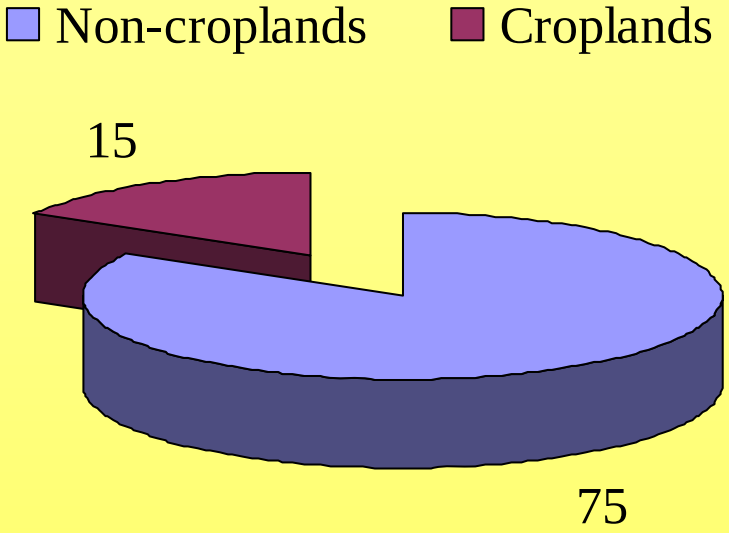
Rice agriculture: greater capacity for food supply

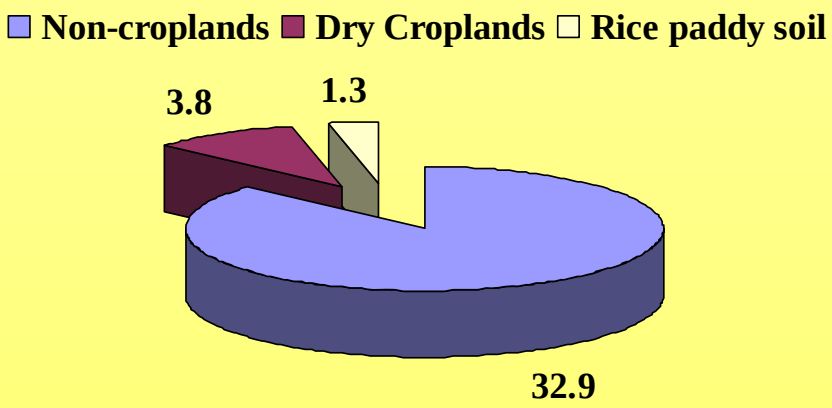


Cereals productivity of rice area and non-rice area of China
(data source: State Statistics, 2000)

Soil SOC stock (Pg) in 1980's



Whole Soil(100cm)



Topsoil (cultivated layer)

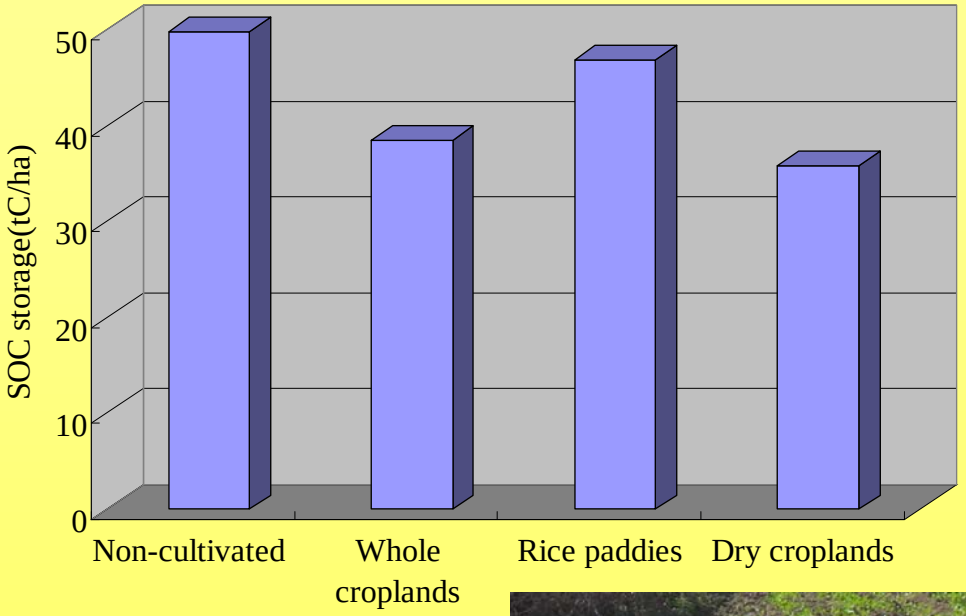
Dry croplands: 74% in area of 79%;

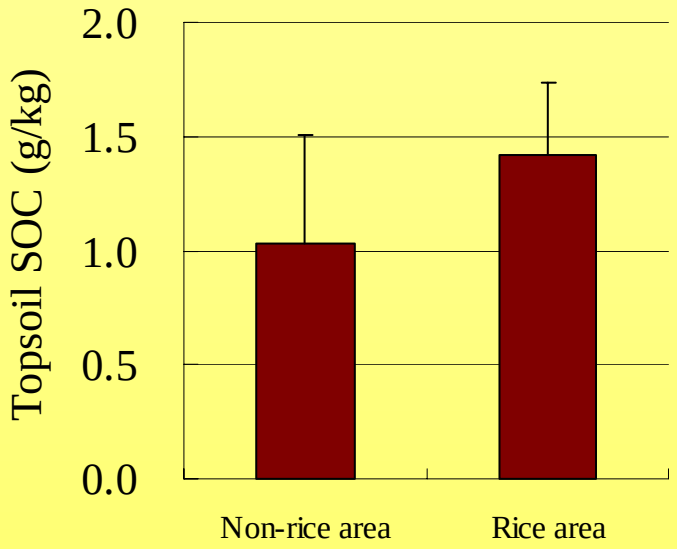
Rice paddies : 26% in area of 21%

China State Statistics, 2006

Rice Soils: Higher SOC storage

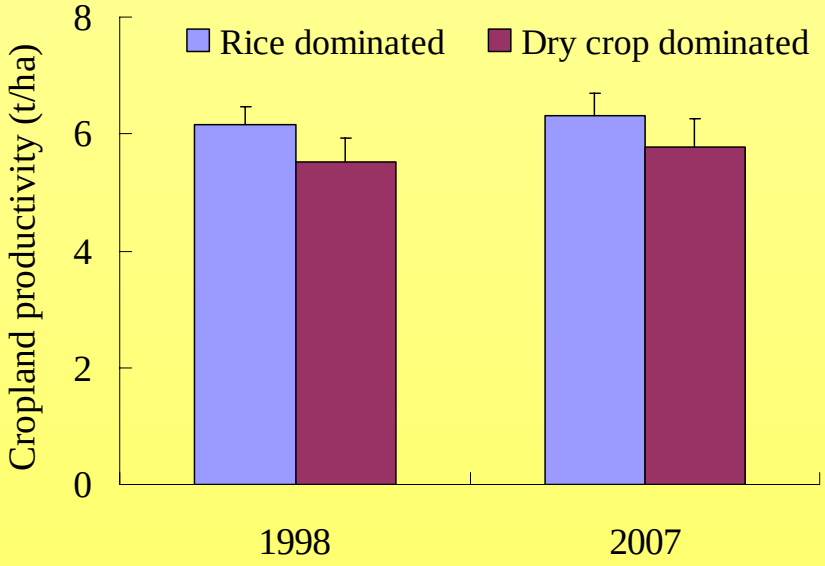
Rice paddies contains almost 10tC/ha higher than dry croplands.

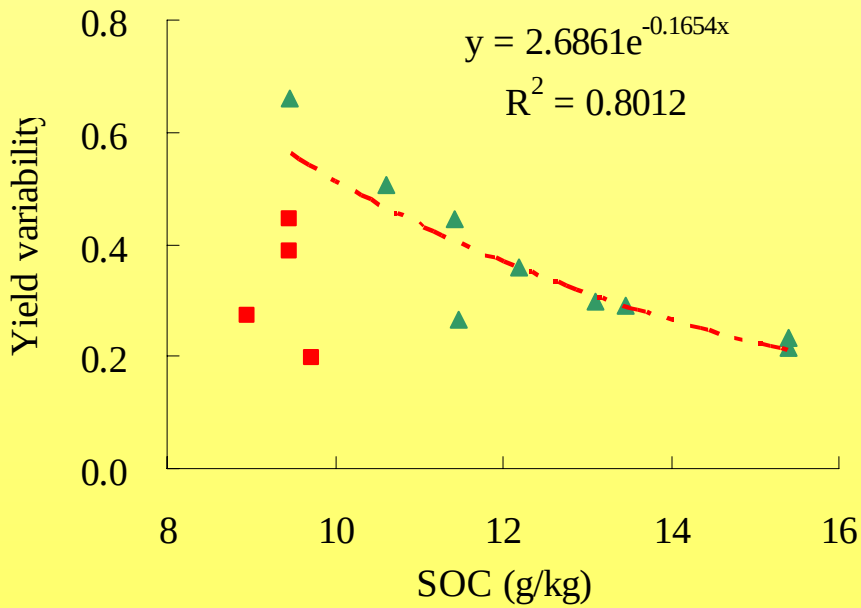




Data source: 2nd National Soil Survey in 1979-1982

Higher productivity and stability of rice agriculture than dry cultivation

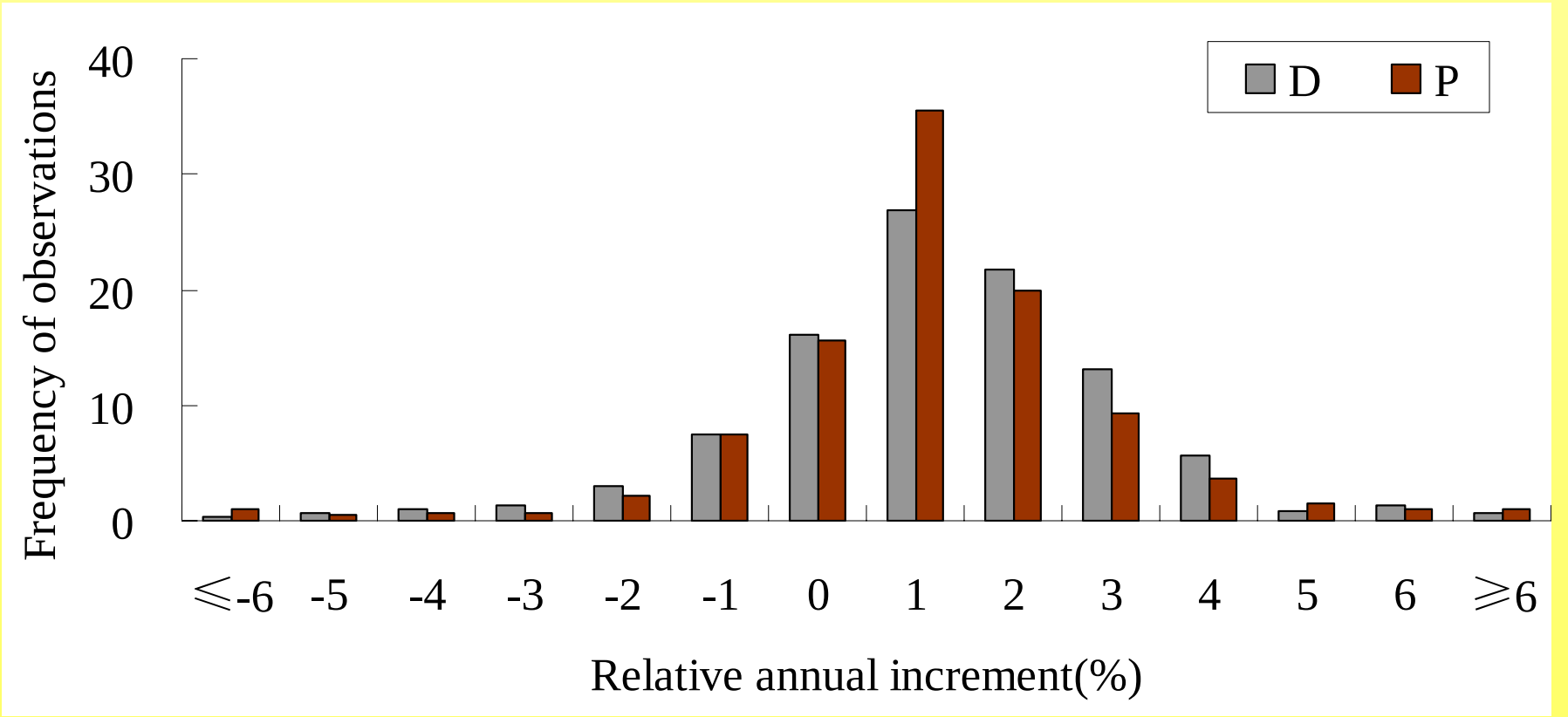




A example of cereals production of Jiangsu during 1998-2007

Dynamics of SOC of China's croplands

(Monitoring data over 1982-2006,1099samples)

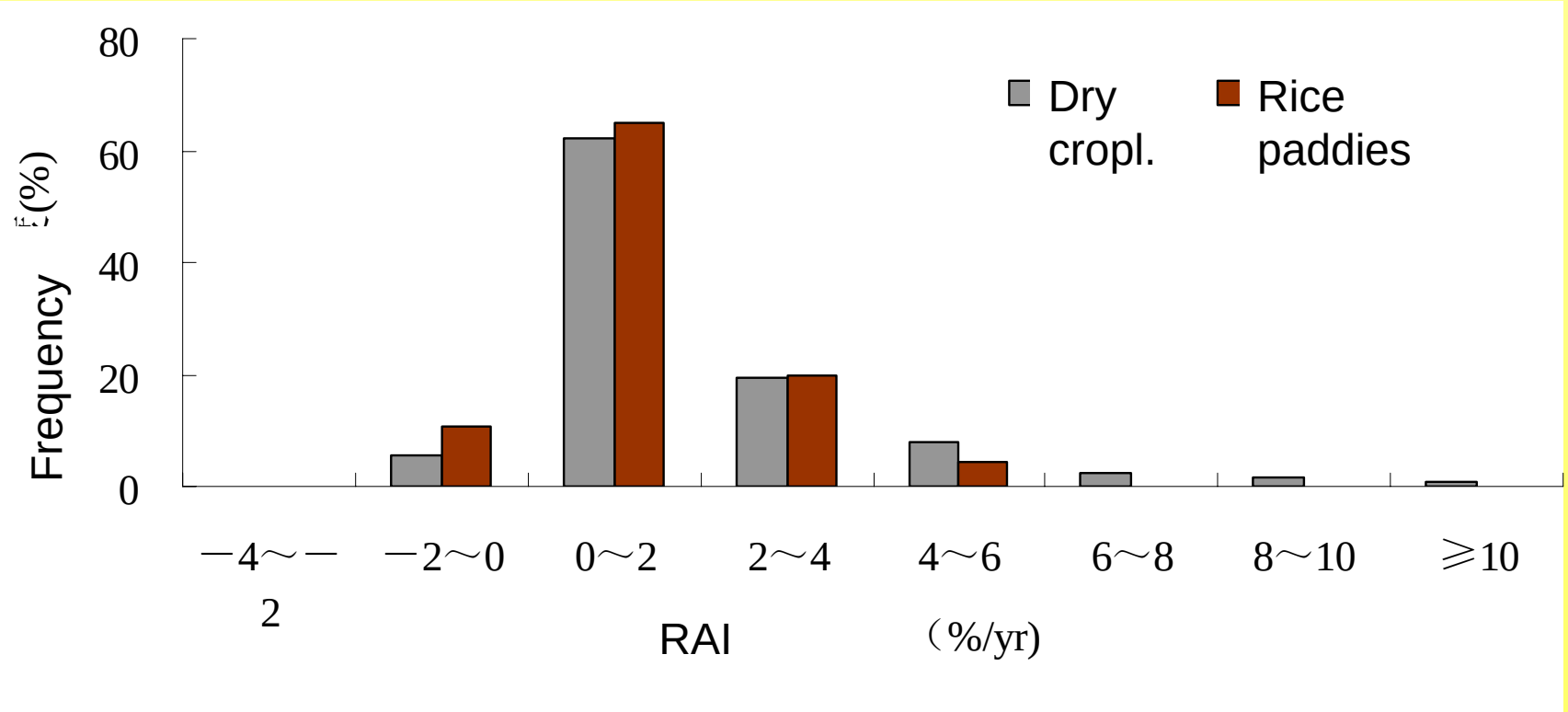


An overall increase trend !

(mean RAI, 0.72%/yr for dry croplands and 0.65%yr for rice paddies)

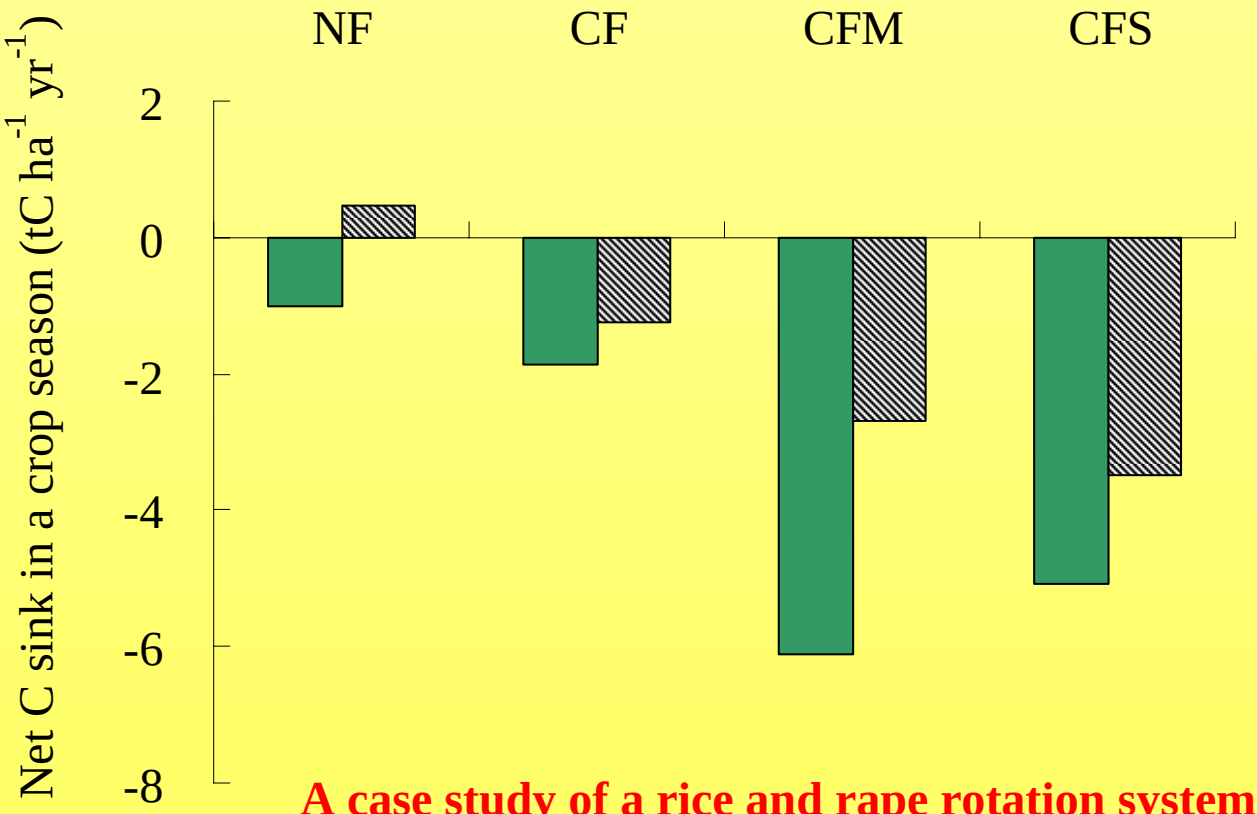
SOC dynamics under long-term fertilization experiments

(67 sites, 473 samples over 1982-2007)



SOC enhancement could be promoted double as the conventional croplands

C sink effect under rice higher than under dry crop



A case study of a rice and rape rotation system under different fertilization from Jiangsu, China.(Li et al., 2008. submitted)

Rice agriculture of China:

Future trends

Care for higher productivity and better environment

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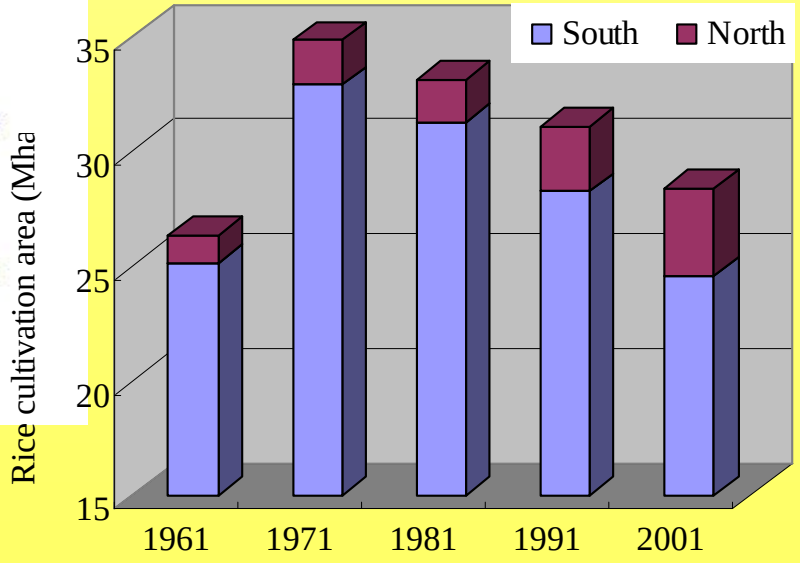
Super rice for enhancing productivity

Super rice is under extension in rice area of South China, high productivity using less land and water resources

Rice cultivation is moving north and west!

Rice cultivation up to N 46° 44′, E 132 ° 26′, in Heilongjiang 2007 was 2.3 Mha.



Enhancing residue input

Straw residue is increasingly returned to soil but lack of technology of efficient utilization

Increasing soil conservation

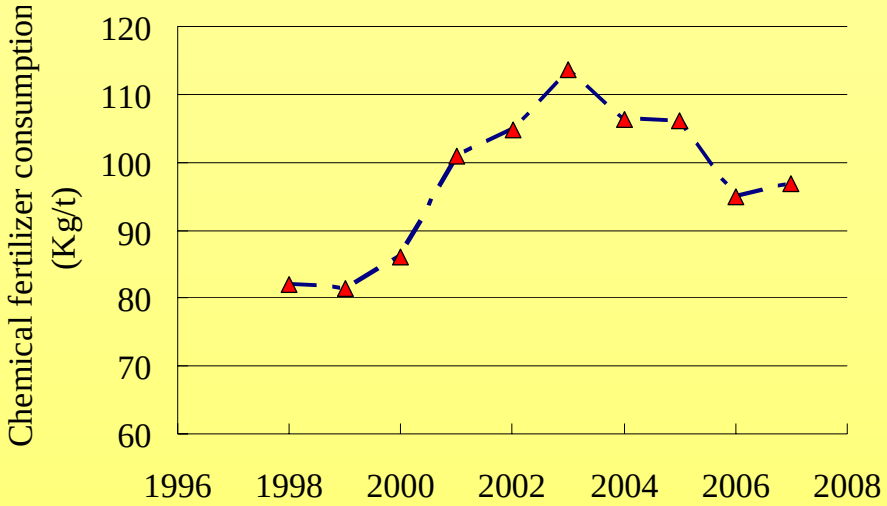
Increasing winter fallow in South China.

Reducing tillage disturbs after late rice

Reducing chemical fertilization

Chemical fertilization is stabilizing or reducing.

Organic amendments are increasingly combined with chemical fertilization.



Change of chemical fertilizer consumption per ton of cereals over 1996-2007 in the rice area of Tai Lake region, Jiangsu, China. Data source: Jiangsu Bureau of Statistics, 2008.

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N efficiency and mitigation in rice agriculture with combined fertilization: Lessons from a case study

Increased rice yield：1.6~1.6t/ha/yr;

N fert. saving：0.02~0.03tN/t(grain)/yr

N reduced with SOC：0.08~0.10 tN/ tC/yr;

Total potential N saving：2.4 Mt/yr

C offsetting for China：2Mt C

(0.875tC/tN manufacturing）

Total enhanced C sink: 120TgC/yr

张平究等,生态学报,2004

Incentives or C trading needed for farmers

Available at present:

(1) Incentive for SOC enhancement: 225 CNY/ha; MOA, since 2003

(2) Incentive for cereals production: 300 CNY/ha in Guangdong since 2007

(3) For climate change mitigation: ?

Suggestions for C incentives: according to C sink effect counting

- Marginal C cost: 150-200 CNY/tC;
- C sink effect under rice agriculture: 2~6 tC/ha
- Economy income from rice cultivation: 9-10 K CNY/ha/yr;
- Estimated additional C incentive: 200-300 CNY/tC/ha

Solutions for Resilience Adaptation with Rice Agriculture

- 1 Potential reachable:
- 2, Sound policy to be implemented;
- 3, C incentive or C trading to be available;
- 4, Low C technology or C sink enhancement technology transfer, eg: ***Biochar*** in situ?

Thanks for your Attention!