

China Actions of Sustainable Agricultural Mechanization to Promote Smallholders' Resilience to Climate Change

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Outline

- ◆ Policies
- ◆ Practices
- ◆ Comments

The Inexorable Trend of Modern Agriculture

- More population, more food.
- More farmers to city, few farmers do farming, require increasing productivity of labour.
-

**In the future,
more and more
farming work is
done by machines,**



Part 1 Policies and Actions in China

China's Policies and Actions on Climate Change (2015)

The National Development and Reform Commission
November 2015

20

China's Policies and Actions
on Climate Change

(I) Agriculture

Accelerating and promoting the transformation and modernization of agricultural production patterns. The Ministry of Agriculture (MOA) has worked in conjunction with China Meteorological Administration and developed 4 work plans including Plan to Cope with El Nino and Ensure Good Harvests, and issued 18 Notices on disaster prevention since 2014 for early implementation of preventive measures. It also organized work such as "Strengthening Guidance and Services to Win Summer Grain Harvest", "Fighting Spring Drought and Flood to Ensure Spring Seeding in Northeast" and "Enhancing Services and Fighting Disasters to Win Autumn Grain Harvest".

Promoting conservation tillage. In 2014, MOA invested 30 million Yuan to carry out conservation tillage in many regions, including 84 project-implementing counties and 10 test monitoring bases. By the end of 2014, the area with mechanized straw returning to the field reached 647 million mu, the area of conservation tillage reached 129 million mu, and the weight of wind-eroded farmland was cut by 64.5 Mtons.

Continuing to carry out farmland infrastructure construction. China enhanced soil fertility improvement, carried out "Action of

Including Agr Mech and conservation tillage

Enact Law on Climate Change

中国国家发展和改革委员会应对气候变化司、英国驻华大使馆
“启动中国气候变化立法——信息分享和国际经验借鉴”项目

应对气候变化立法 通 讯

第三期（2011 年 11 月）

主编：中国政法大学环境资源法研究所

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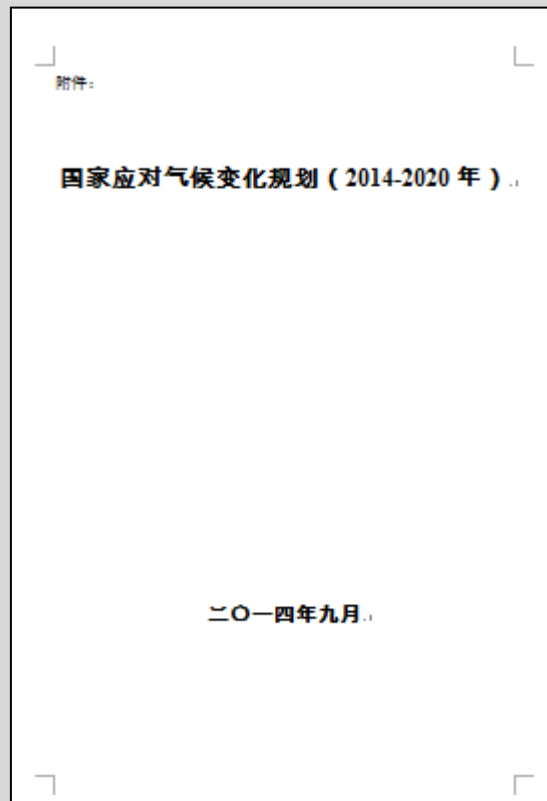
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Long Term Plan on Climate Change



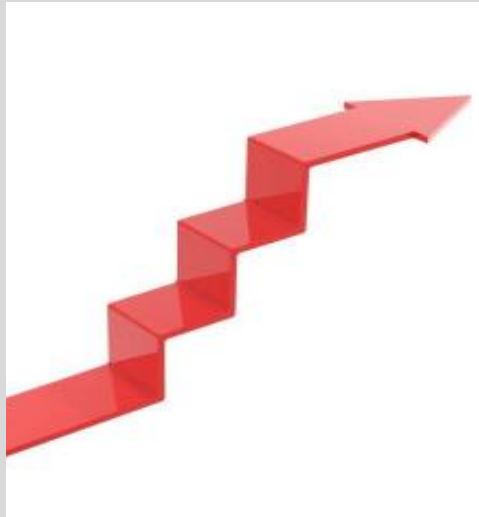
第八节 控制农业、商业和废弃物处理领域排放

控制农业生产活动排放。积极推广低排放高产水稻品种，改进耕作技术，控制稻田甲烷和氧化亚氮排放。开展低碳农业发展试点。鼓励使用有机肥，因地制宜推广“猪-沼-果”等低碳循环生产方式。发展规模化养殖。推动农作物秸秆综合利用、农林废物资源化利用和牲畜粪便综合利用。积极推进地热能在设施农业和养殖业中的应用。控制林业生产活动温室气体排放。加快发展节油、节电、节煤等农业机械和渔业机械、渔船。加强农机农艺结合，优化耕作环节，实行少耕、免耕、精准作业和高效栽培。

Including Agr Mech and conservation tillage

Old Machines Update

Encourage farmers to update their old high emission tractors.



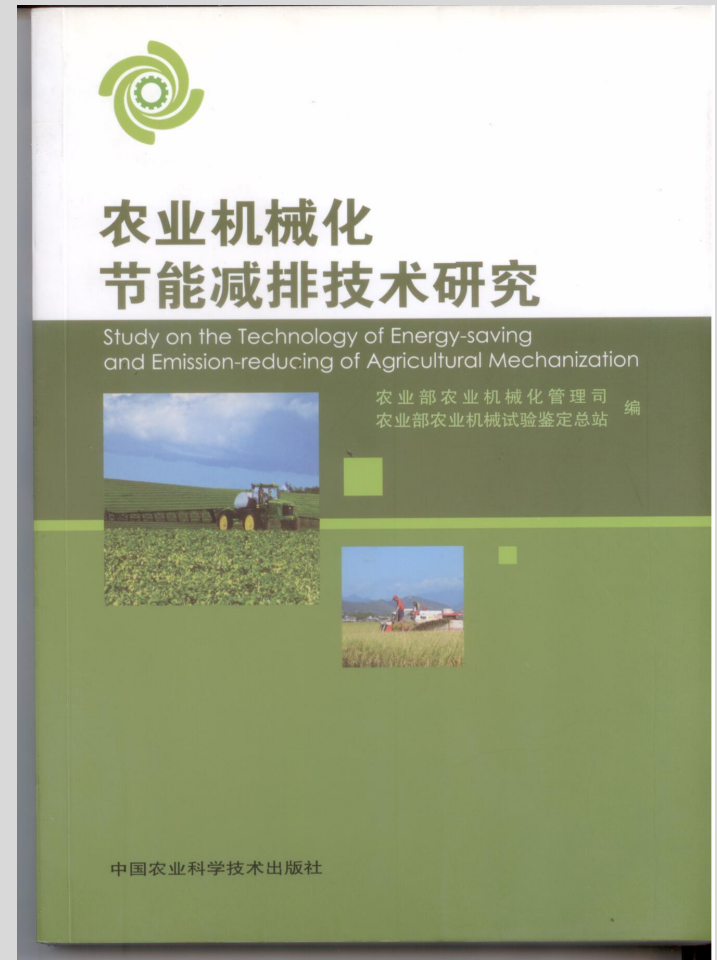
Increase emission standard of Diesel Engine

- From 2016, all new diesel engines for agricultural machines must meet the 3rd phase standard, to reduce waste gas emission.



Long Term Plan on Climate Change

Technology of Energy Saving and Emission-reducing of Agricultural Mechanization



Part2 Practices

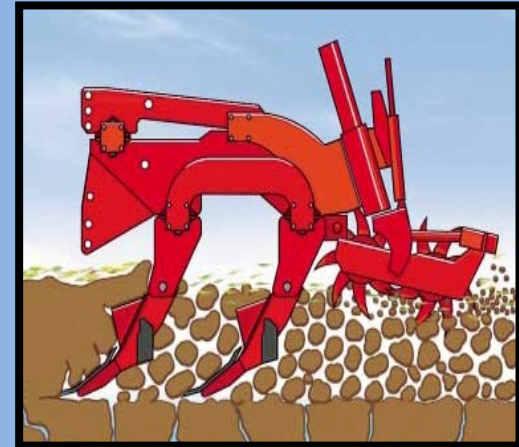
- Land preparation pre-seeding
- Seeding
- Spray agricultural chemicals
- Harvest
- Social Service

Land preparation pre-seeding

- Subsoil (Deep loose) instead of plough
- Stubble covered land instead of bared land
- Combined machines instead of single function machine



Plough



Deep loose



Benefits compared with Plough

- Reduce oil consumption;
- Reduce cost;
- High Yields;
- More water storage;
Less CO₂ emission

Bared field



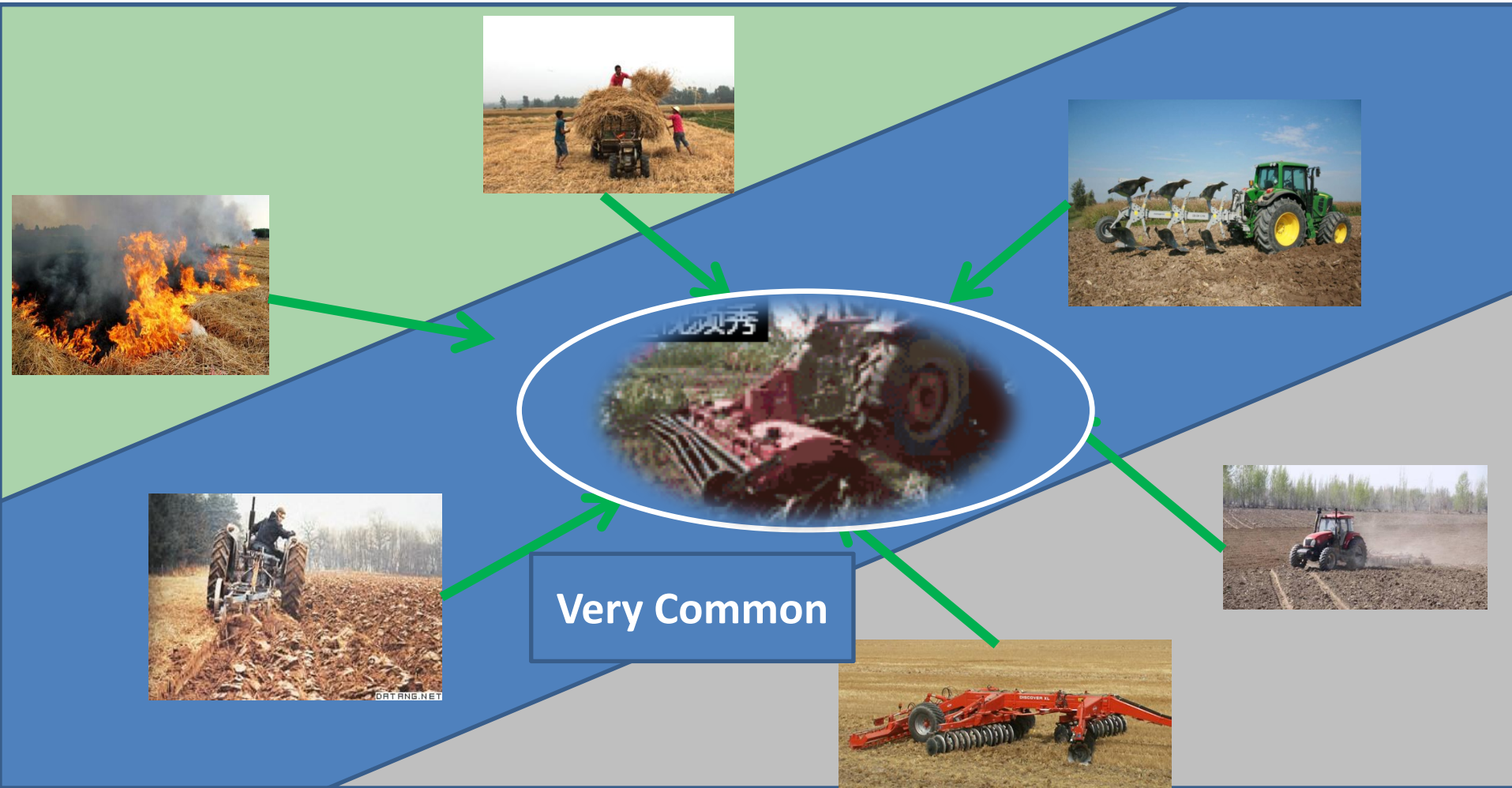
In Norther China, most farmers bared their fields without cover.

Easy evaporation; easily eroded by wind; very dry before seeding in Spring

Coverd field



Multifunction Machines



Seeding

- No till or minimum till Seeding



Preparation + Seeding

The best method



- One pass can finish land preparation and seeding.
- Save energy, cost, time; improve soil moisture, organic matter, yield

Increase yields



Increase 5%~50%

增产 5%~50%



Also reduce cost 30%-50%

Reduce Water Erosion



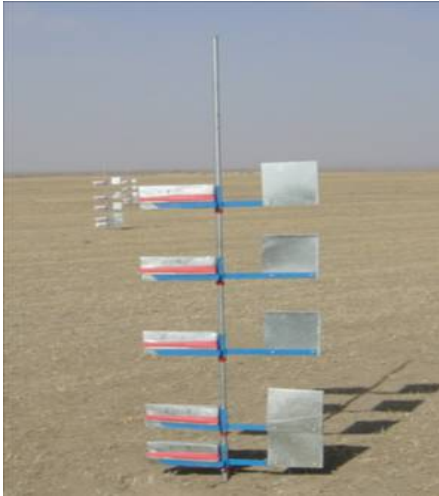
Runoff Experiment

Reduce water erosion
50%-80%



Rainfall Simulation

Reduce Wind Erosion



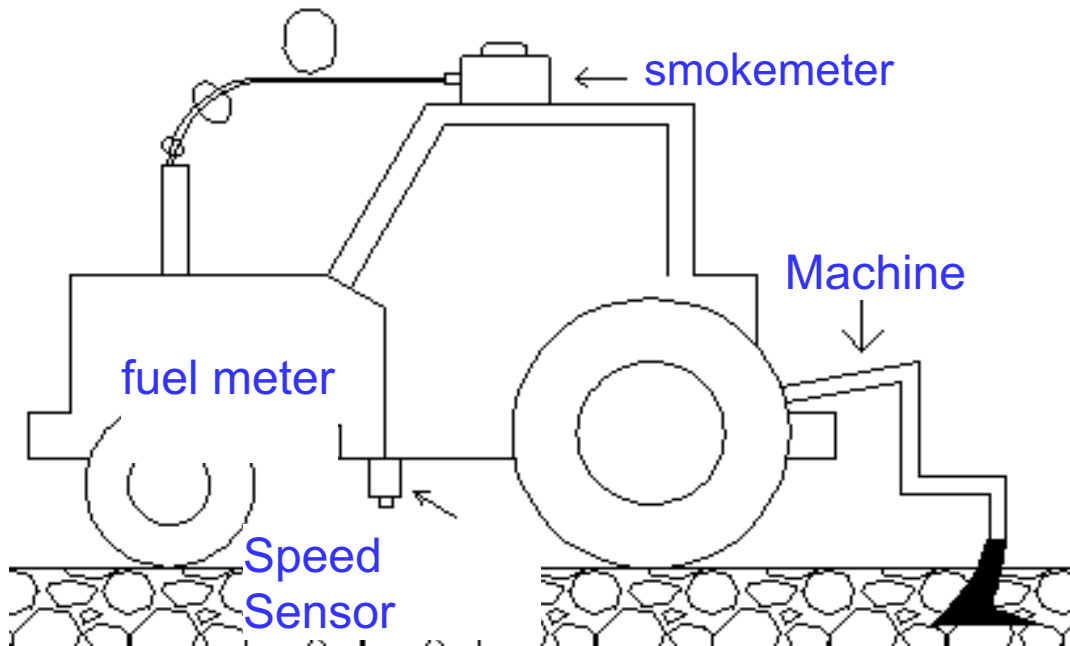
Dust Sampler

>50%



Wind Tunnel

Reduce Fuel Consumption

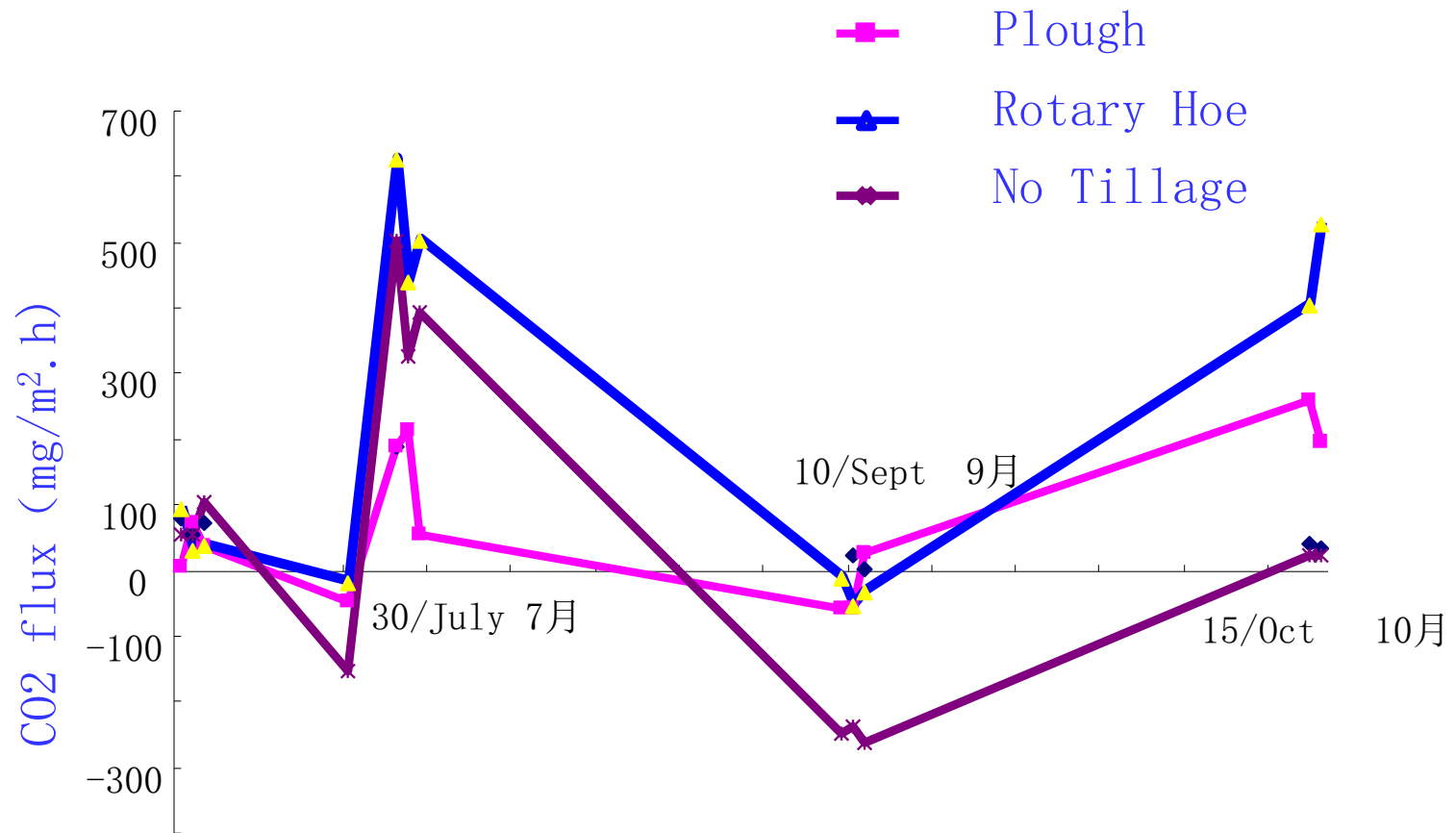


> 30%

Effect of CT on GHG Emission from Field



Reduce C₂O emission



Increase Organic matter



No earth worm
in plowed field

After 3 years conservation
tillage, can find earth worm.

10~15/m² after 10 years



Spray agricultural chemicals

- Old technologies



Spray agricultural chemicals

- New technologies



Water saving irrigation



Combine harvest



Social Service of agricultural mechanization

- High level management to increase use efficiency of agricultural machines



Comments

- To extend sustainable agricultural mechanization to farmers to reduce GHG emission from farm, not directly from reducing GHG emission
- Conservation tillage is one of the best agricultural mechanization technology which can get double wins of yields and environment
- Better management of agricultural machines to get high use efficiency
- Establish an Asian Unit research center or Alliance to find the sustainable technologies for each countries

Catoon book

Conservation Agriculture Cartoon book	E
Conservation Agriculture Cartoon Book (Chinese version)	(Chinese)
Conservation Agriculture Cartoon Book (Russian version)	(Russian)
Conservation Agriculture Cartoon Book (Mongolian version)	(Mongolian)
Conservation Agriculture Cartoon Book (Arabic version)	(Arabic)
Conservation Agriculture Cartoon Book (Kiswahili version)	(Kiswahili)
Conservation Agriculture Cartoon Book (Bangla version)	(Bangla)
Conservation Agriculture Cartoon Book (Thai version)	(Thai)

- <http://www.fao.org/ag/ca/8.html>

This wonderful booklet offers hands-on, practical advice for farmers and extension workers interested in using conservation agriculture techniques to boost crop yields, soil quality and water retention. These practices represent some of the many ways we can become more 'climate smart', which is essential if we are to sustainably produce more food on less land to feed our growing planet.

– Juergen Voegelé, Senior Director,
Agriculture Global Practices, World Bank

Conservation Agriculture: a modern farming practice with ancient Chinese philosophy.

– Ke Bingsheng, President,
China Agricultural University

Smart use of land resources can turn agriculture around from being part of the problem to being part of the climate change solution.

– Saidi Mkomwa, Executive Secretary,
African Conservation Tillage Network

Sharing of experience between practitioners through South-South exchanges is an effective way to learn from mistakes of the past and scale up successes to meet climate change challenges.

– Neeraj Prasad, Manager,
Climate Change Knowledge, World Bank



定价: 20.00 元



Exchanging Experience with Conservation Agriculture Towards Climate Resilience

Authors: **LI Hongwen, XIE Mei, HE Jin**
Art drawing: **JIANG Heping**



科学普及出版社
POPULAR SCIENCE PRESS



Use the book title to search on yahoo.

<http://documents.worldbank.org/curated/en/492271468160172835/Exchanging-experience-with-conservation-agriculture-towards-climate-resilience>

A wide-angle photograph of a green agricultural field, likely a cornfield, with rows of young plants. The field is covered with green grass and some dry, yellowed corn stalks. In the background, there is a line of trees and a small structure, possibly a farm building, under a hazy sky. A yellow rectangular box is superimposed over the center of the image, containing the word "Thanks" in blue text.

Thanks