

# China GHG emission from agricultural activity and its mitigation strategy

## 中国温室气体排放和减排对策



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# Outline

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- ❑ **Background**
- ❑ **Current and projected GHG Emissions from Agricultural Sources**
- ❑ **China's Efforts to Mitigate GHGs Emissions from Agricultural Sector**
- ❑ **CDM Project Potential**

# Background

## basic circumstance

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- ❑ **China is the largest developing country.**
- ❑ **Farmers account for about 65 % of the Chinese population, and their family income is very low.**
- ❑ **There are a lot of people their income per day is less than 1US\$-**
- ❑ **China's one of the top priorities today is to enhance agricultural sustainable development and promote farmers' living standards**

# Background

## – Preliminary judgment

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- **Per capita GHG emission in China's remains low. With population increase and living standards improvement, the consumption of agricultural products will continue to rise, the rate of and the agricultural development will continue increase**
- **In the absence of major technological breakthroughs, GHG emissions from agricultural sector will continue to increase in China in the future.**

# GHG emission from agriculture sector

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- **GHG emission from agricultural sector accounted for 17% of China's total GHG emissions in 1994;**
- **CH<sub>4</sub> emission from agricultural sector contribute to 50% of China's total CH<sub>4</sub> emission**
- **N<sub>2</sub>O emission from agricultural sector accounted for 92% of China's total.**



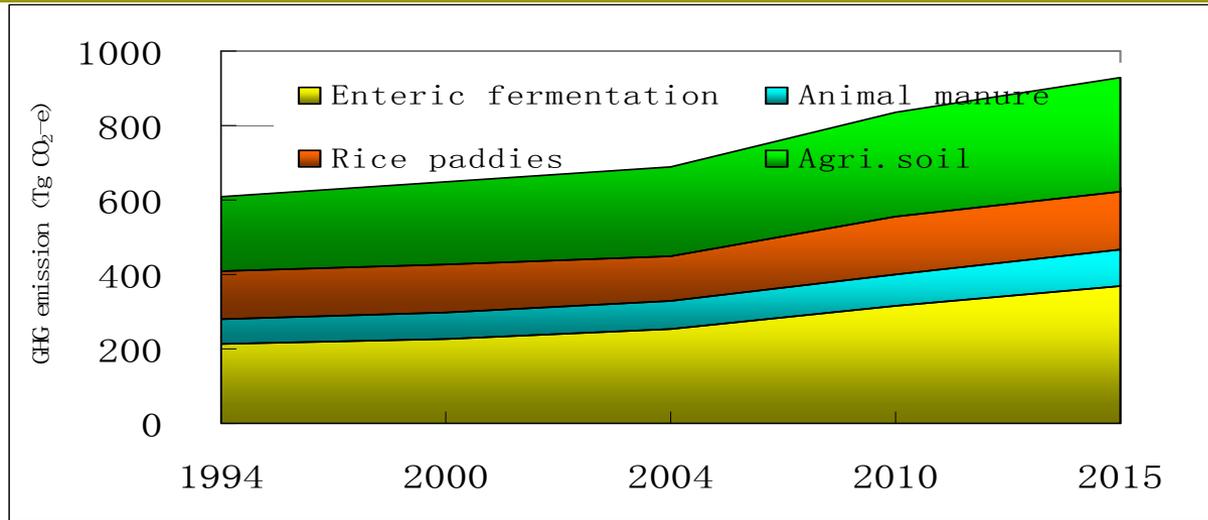
# Agricultural Activity for GHG emission

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**Major GHG emissions sources in agricultural sector include rice paddies, livestock production, manure management as well as N fertilization.**

- Rice paddies: planting area accounted for 19% of the world total**
- Year-end stocks of cattle, pigs and sheep in 2004 in China accounted for 8.5%, 50% and 18% of the world totals respectively**
- Nitrogen fertilizer consumption accounted 30% of world total**

# Projection of GHG Emissions from Agricultural Sector in China



**By the year 2015, It is estimate that GHG emission from agricultural sector would reach 900 million tons of CO<sub>2</sub> equivalent , increase by 48% over 1994.**

**The leading contributors to such increases will be methane emission from livestock and nitrous oxide emission from cropland, representing an increase of 73% and 53% over 1994 respectively.**

# China's Efforts to Mitigate GHGs Emissions from Agricultural Sector

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- ❑ **With the circumstance of increasing population , shortage of resources**
- ❑ **Chinese government has taken a number of initiatives to ensure the sustainable agricultural development and to improve farmers' living standards, these initiatives reduced GHGs emissions to some extend.**
- ❑ **Most of there program or measures could contribute to GHG mitigation**



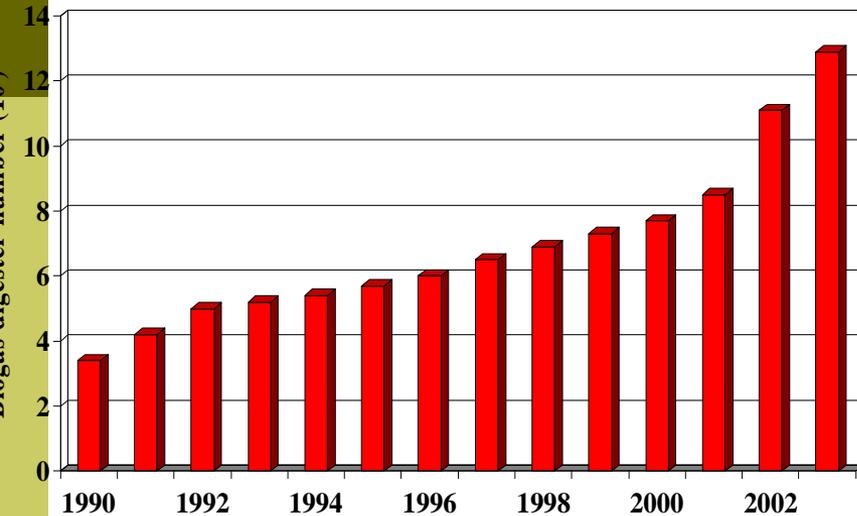
# Implementation of Eco-household Programme

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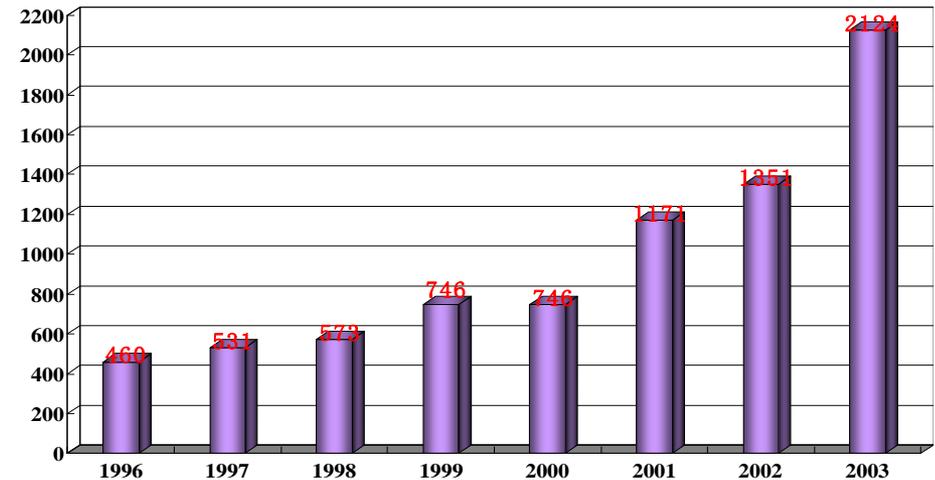
- ❑ MoA is implementing an Eco-household Programme for promoting sustainable agriculture development
- ❑ This programme focuses on renewable energies
- ❑ To realize the goal of increasing farmers' income and improving their living environment



# Population of Biogas Digesters



By the end of year 2005, household biogas digester had reached 17 million with a total biogas production of 6.5 billion m<sup>3</sup>



The number of large-scale biogas digesters for manure treatment had reached 2200, with an annual manure treatment capacity of 45 million m<sup>3</sup>.

# Extension of soil measurement-based fertilization

- ❑ **MoA initiated soil measurement-based fertilization programme across the country**
- ❑ **It sent out 100,000 technicians to villages and trained 50 million farmers. The programme covered 16.7 million hectares of arable lands**
- ❑ **Such initiative reduce the amount of fertilizers and nitrous oxide emission as a result.**



# Enhancement of comprehensive utilization of straw

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- ❑ **By the end of year 2005, Chinese Government had invested 110 million Yuan to extend the straw mulching and no-tillage practices**
- ❑ **The conservative tillage reached 3.36 million hectare.**



# Enhancement of comprehensive utilization of straw

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- ❑ **MoA strongly support to feed cattle using treated straw**
- ❑ **At present, there have been 501 demonstration counties practising feeding cattle with treated straw**
- ❑ **The total silage and ammoniated straw reached 175 and 53 million tons respectively in China.**

# Needs for further mitigating GHG Emission from Agricultural Sector

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- ❑ **With severe shortage of arable lands and under more vulnerable ecosystems, it seems to be rather difficult for China alone to achieve a “win-win” solution**
- ❑ **Technical innovations, technology transfer and cooperation are definitely necessary**

# Emission reduction technologies

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- ❑ **Variety selection and breeding of high-yield livestock and crops;**
- ❑ **Technologies for treating animal wastes and utilization;**
- ❑ **Environment-friendly fertilizers**

# CDM opportunity

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- **Manure management**
- **Biogas digester for methane reduction and energy substitute**



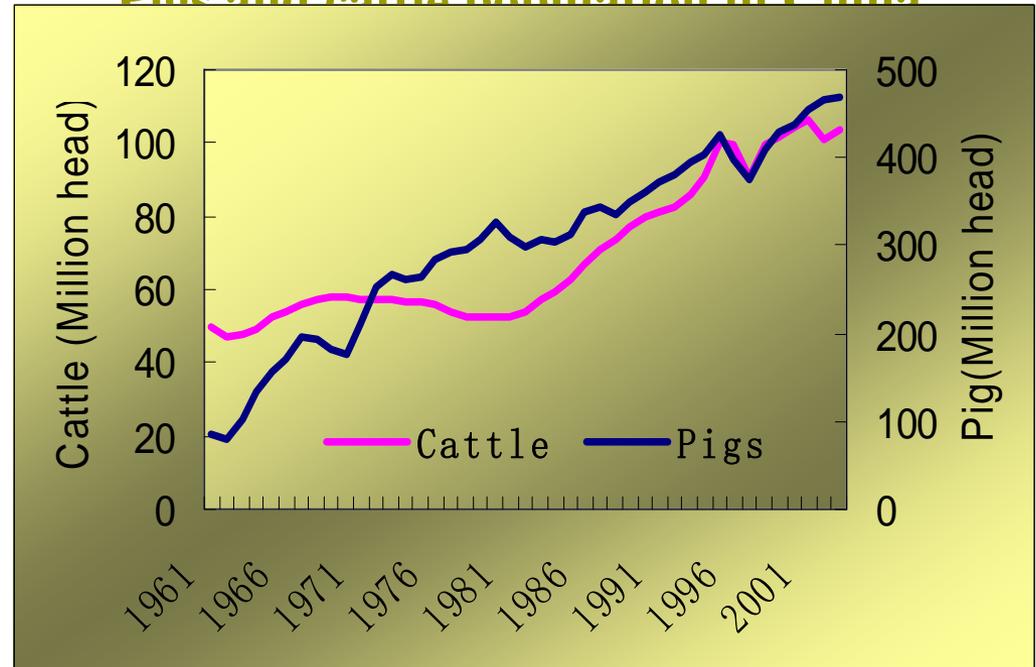
# Background

## Animal population

Percentage share of China's AP to the world's AP

Category	(%)
Pigs	50
Cattle	8
Buffaloes	13
Goats	23
Sheep	14
Mules	33
Horses	15
Asses	21
Chickens	24

Pigs and cattle population in China



# Large biogas digester project opportunity in China

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CAFO swine farm number with different animal population

Head/Farm	Number
3000-9999	4162
10,000-50,000	1048
>50,000	44

Middle and Large biogas digesters

Large biogas digester	Number	Volume 1000m <sup>3</sup>
2001	1171	316
2004	2124	550

1. Potential for large digester project: >2000 biogas digester
2. Most of the current digester were used to treat manure for environment, biogas was not fully utilized

# Percentage of concentrated animal facility operation in 2005

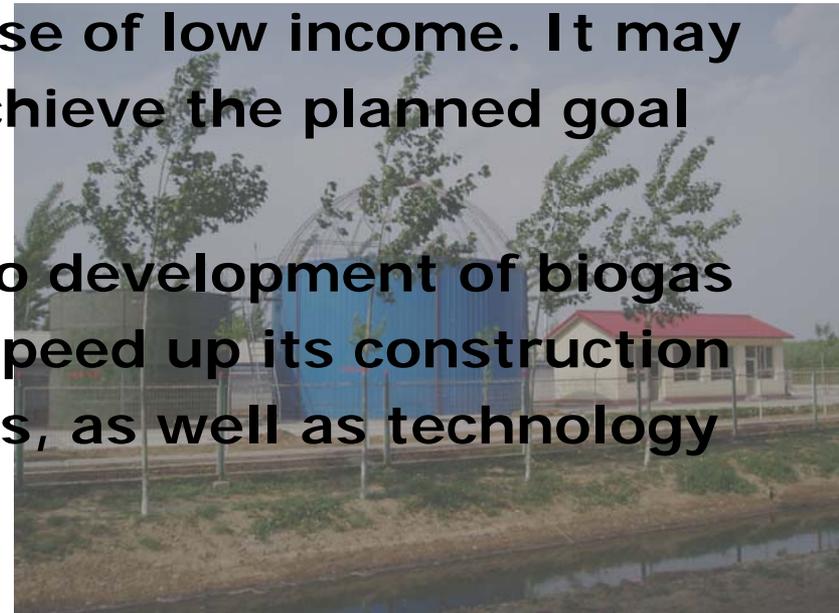
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	Standard ( head )	CAFO in 2005 ( % )	CAFO Increase than 2000 ( % )
Pig	≥50	34	11.1
Broiler	≥2000	74.2	15.8
Dairy cow	≥5	55.2	5.1

# CDM would speed up the construction of biogas digesters

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- ❑ Biogas digester is an effective measure to provide clean energy, to control air pollution and GHG emission , to promote agricultural production and to improve living quality in the rural area
- ❑ Development of biogas digester mainly depends on the financial subsidies. Construction of biogas digesters is beyond farmers ability, because of low income. It may take more than 50 years to achieve the planned goal with current speed
- ❑ We wish to introduce CDM into development of biogas digesters. This will not only speed up its construction but also reduce GHG emissions, as well as technology transfer.



# Case I---Minhe Poultry Farm

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- ❑ **29 chicken farms**
- ❑ **Annual stock: 5 million heads**
- ❑ **Consolidated baseline methodology for GHG emission reductions from manure management systems(ACM0010) was applied**

# Project activity

**IT IS EXPECTED  
CERS 85000 T**



**Baseline: Open lagoon**

**Project activity: Biogas digester  
with power generation**

# Case II--Household Biogas Digester for energy displace (8m<sup>3</sup>)

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- ❑ household biogas diester: gas production = 1m<sup>3</sup>
- ❑ Pig number 4-6 head
- ❑ Baseline manure management : deep pit
- ❑ Energy displacement of fossil fuel 1 t
- ❑ ASM III R + I c was applied
- ❑ **IT IS EXPECTED CERS 2.5-4 T**

# Conclusion

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- ❑ **GHG emission from agricultural sector takes a significant percentage and it would increase trend in the future**
- **The greenhouse gas emission from agricultural sector is so-called “survival emissions”.**
- ❑ **A series of measures and actions have been taken, China is still encountering barriers in financial resource, technologies and public awareness, etc., which are necessary for further reduction of GHG emissions**
- ❑ **In order to slow down the increase rate of GHG emissions from agricultural activities, China strongly wishes that financial and technological support can be provided by international communities to protect our climate while enhancing the development of agriculture and rural area.**



Thanks