

Zinc...essential for life



Crop Zinc Deficiencies and Zn Fertilizer Effect in China

中国作物缺锌和锌肥效果

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Zinc Nutrient Initiative

Global IZA program seeking to:

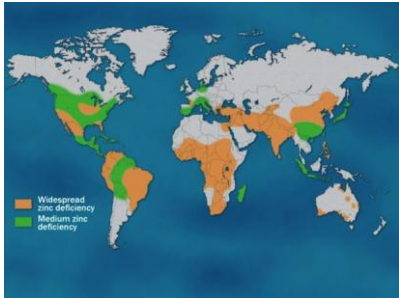
- Improve crop yield
- Improve nutritional value of crops
- Improve human nutrition
- Increase farmer's incomes
- Improve food security



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Zinc is Essential for Crops

- FAO estimates 50% of world's soils growing cereal grains are zinc deficient
- Recognized as the most critical micronutrient deficiency in soils, crops and human nutrition
- Agricultural production must increase by 70% by 2050

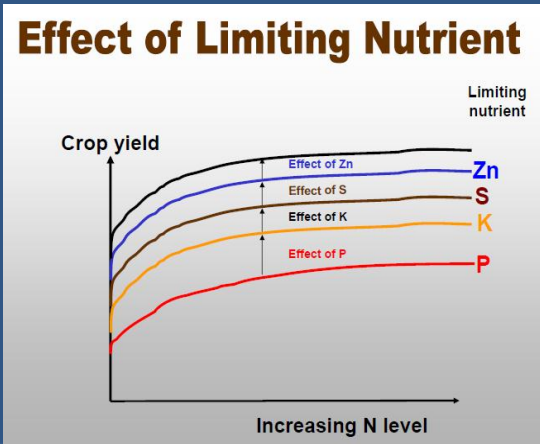


Alloway, 2007

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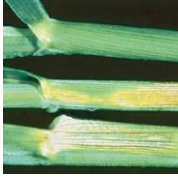


Balanced Fertilization is a dynamic concept

Intensification of agricultural production and large amount of using macronutrient fertilizer, like NPK, cause Zn deficiency in China, which limits crop yields and potential efficiency of NPK application on crop production



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Effects of Zinc Deficiency in Plants

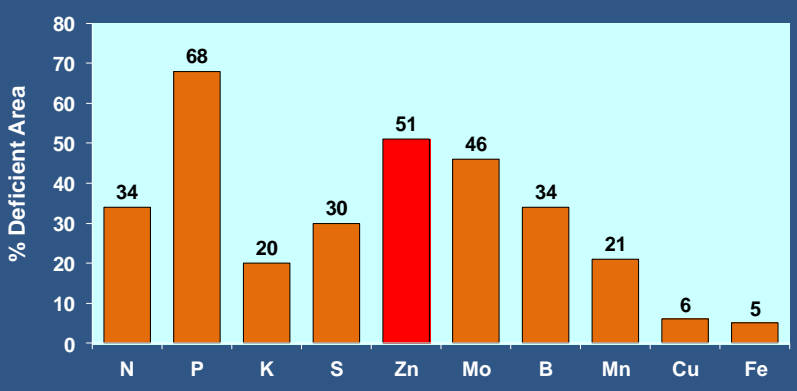
Visible symptoms of physiological stress (stunting, chlorosis, spike sterility etc.)		Increased susceptibility to injury by high light intensity & temperature.
	Reduced dry matter production & yields of grain, fruits and roots.	
Poor quality of crop products (e.g., Zn and protein contents; size & appearance of fruit)		Increased susceptibility to infection by certain fungal diseases.

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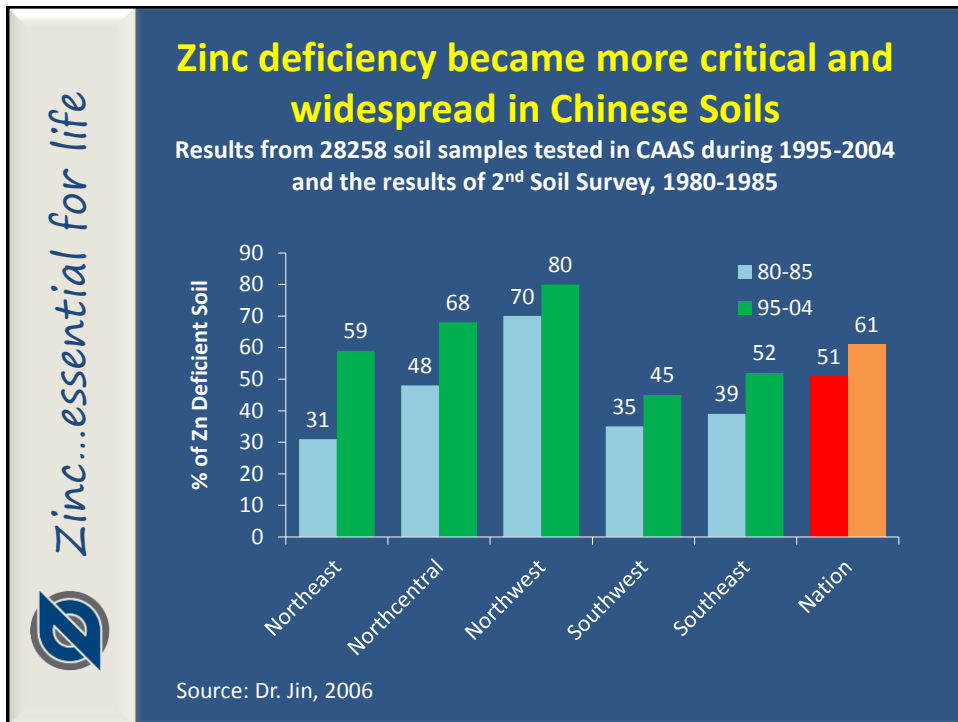
Nutrient Deficiency in China

(2nd National Soil Survey Results in 1980s)

Zinc was the 2nd most deficient nutrient, only after phosphorus



Nutrient	% Deficient Area
N	34
P	68
K	20
S	30
Zn	51
Mo	46
B	34
Mn	21
Cu	6
Fe	5



Chinese Zinc Nutrient Market Potential

Estimated Zinc Deficient Soil Area: 60 Million Ha
Based on 50% of 120 million ha

Zn Application Rate: 5 - 10 kg Zn/ha

Total Zinc Fertilizer Requirement: 300-600,000 tpy

10% Increase of Grain Yield By Zinc Fertilizer: 36 Million tons

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ZNI Objectives in China

- **Increase Awareness** of the Importance of Zinc in Agriculture and Human Health for all Fertilizer Stakeholders
- **Advance Zinc Requirements and Use** in Agriculture by Developing Zinc Fertilizer Recommendation System; Include Zinc into National Fertilizer Recommendations
- **Recognize Zinc as a Fertilizer Nutrient** and accelerate Zinc Fertilizer Production, Marketing and Use



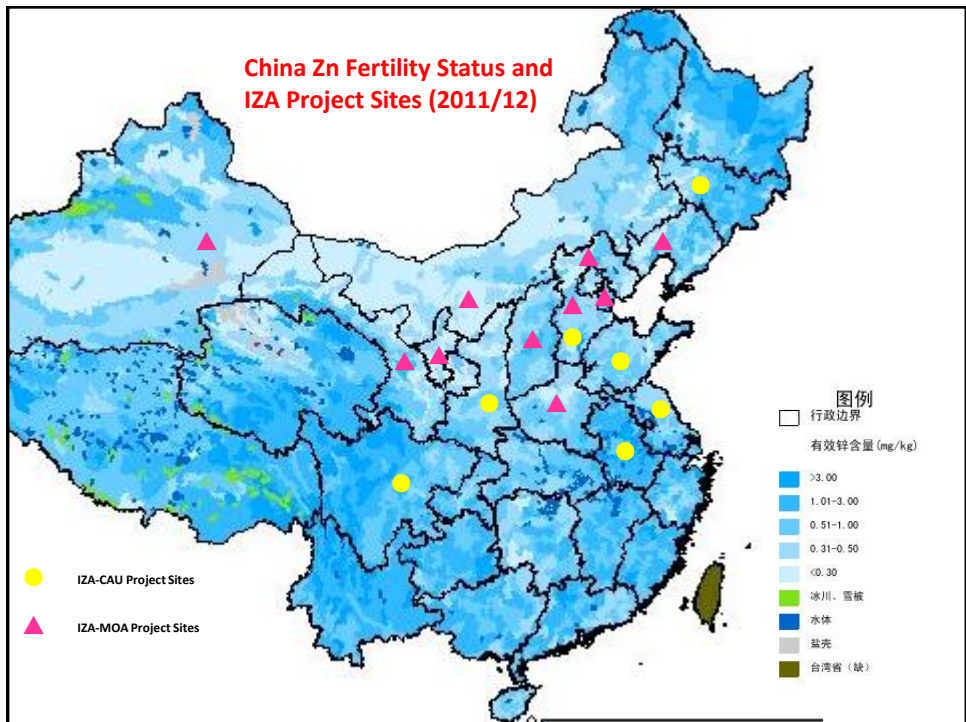


IZA-CUA-MOA Project on Promotion of Zn Fertilizer Use in China (2010-2011)

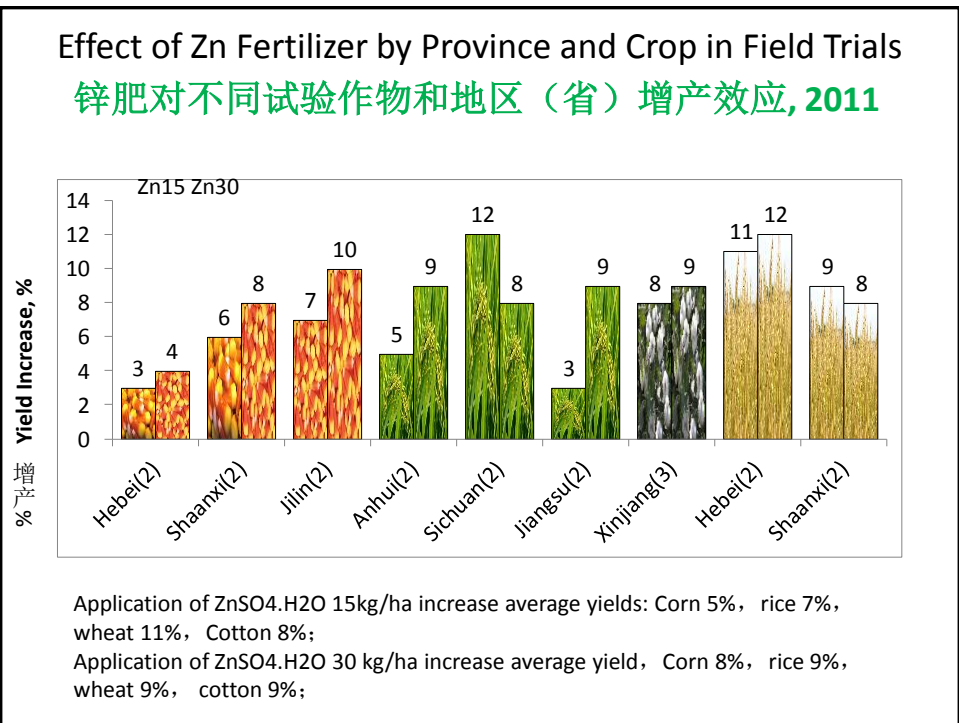
- **Research and Demonstration: 80 Field trials in 12 Provinces on grain** (Rice, corn and wheat) and vegetable and fruit crops
 - Design: 4 Zn Rate: 0, 15, 30, 60 kg ZnSO₄.H₂O/ha 2
 - Application method: Soil, Foliar Spray, fertigation
- **Demonstration Plots: 61 in 12 Provinces** (0.5-1 Ha each with Zn fertilizer at 30 kg ZnSO₄.H₂O/ha vs. control treatment); N-P₂O₅-K₂O: 180-75-75
- **Promotion and Education:**
 - Publications: Brochure and promotional materials, papers
 - Field Days, Site-workshops and training classes
 - Website
 - National Workshops

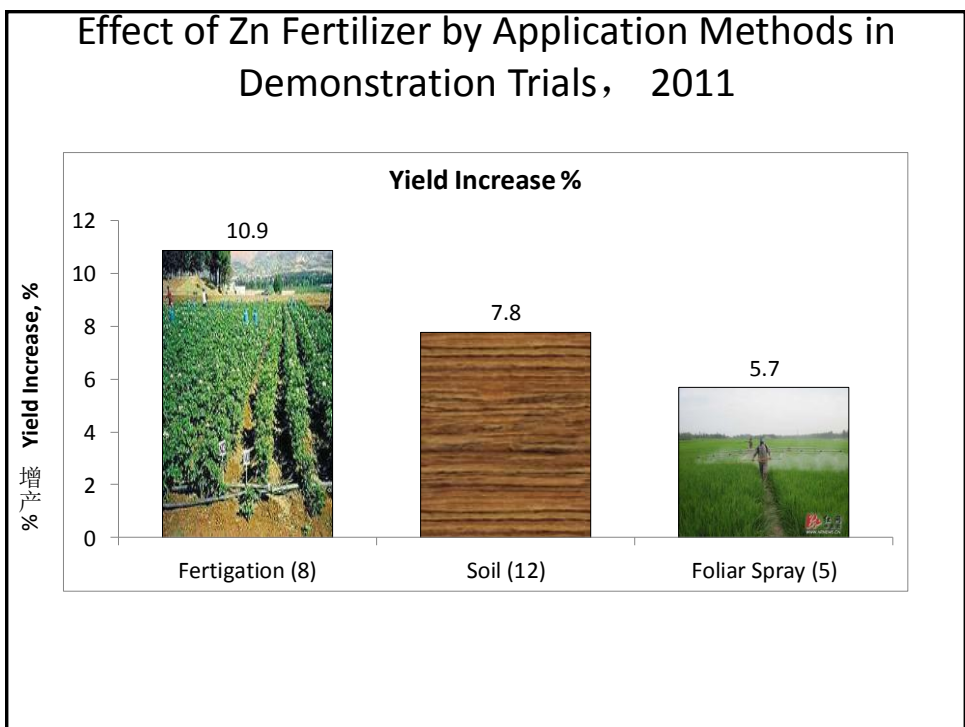
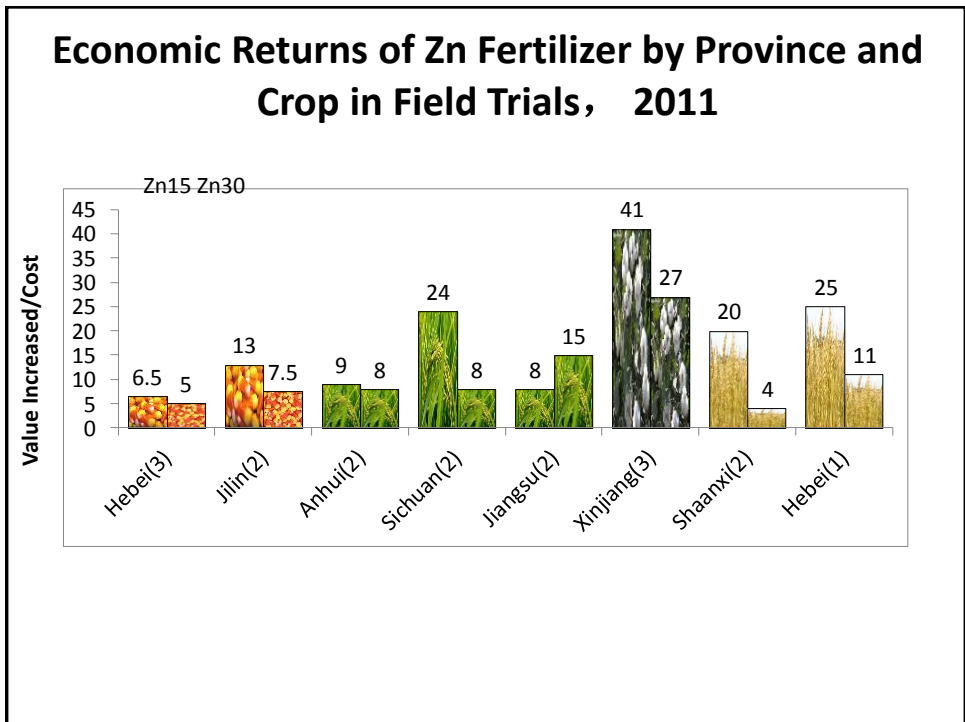


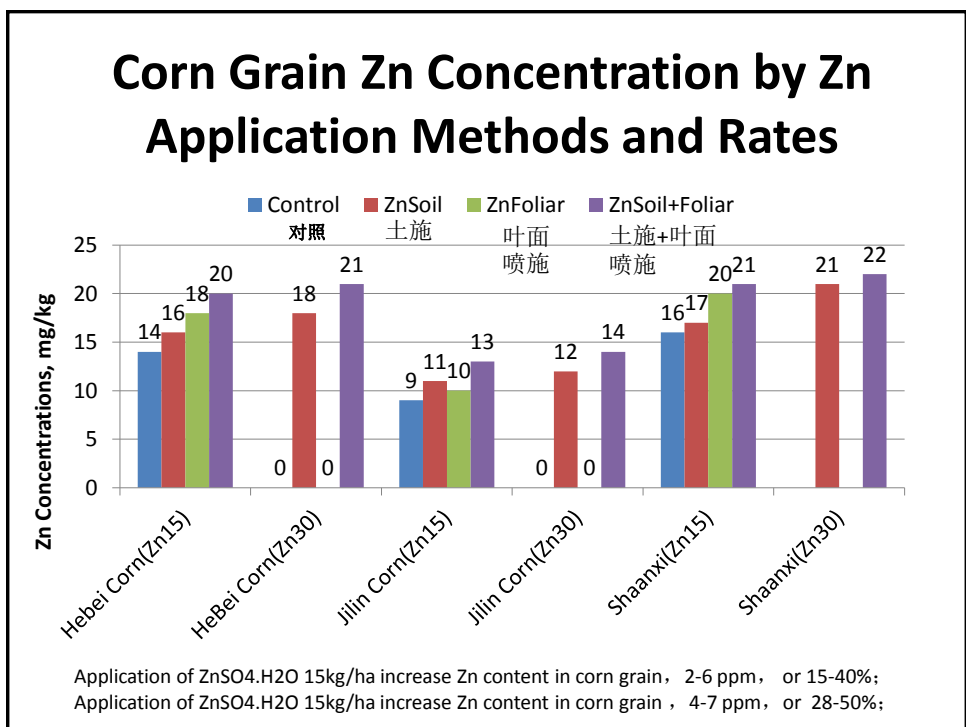
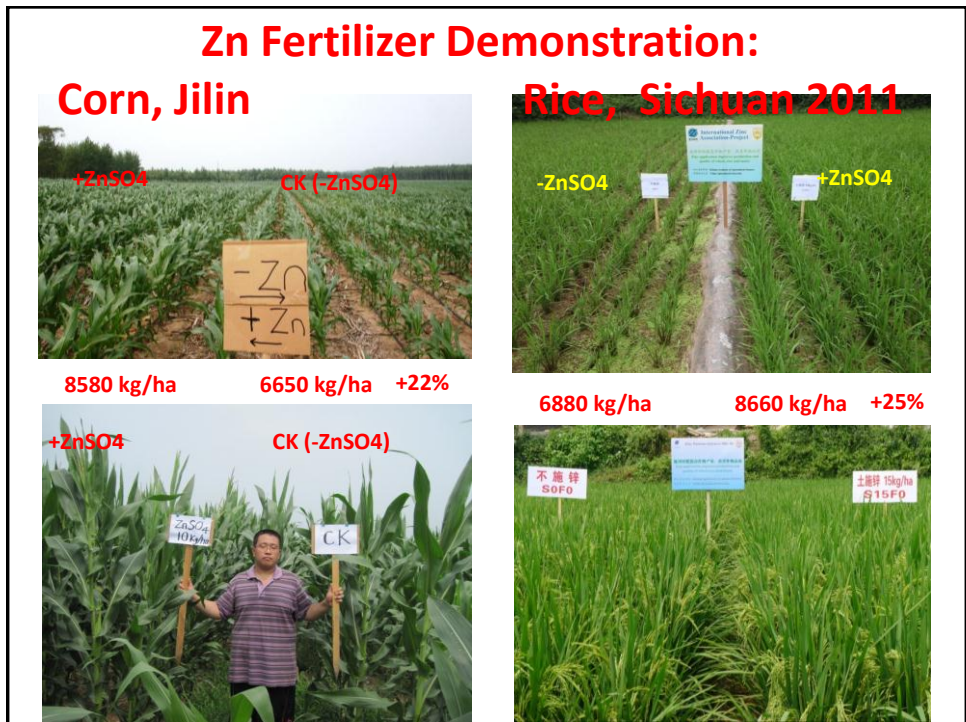
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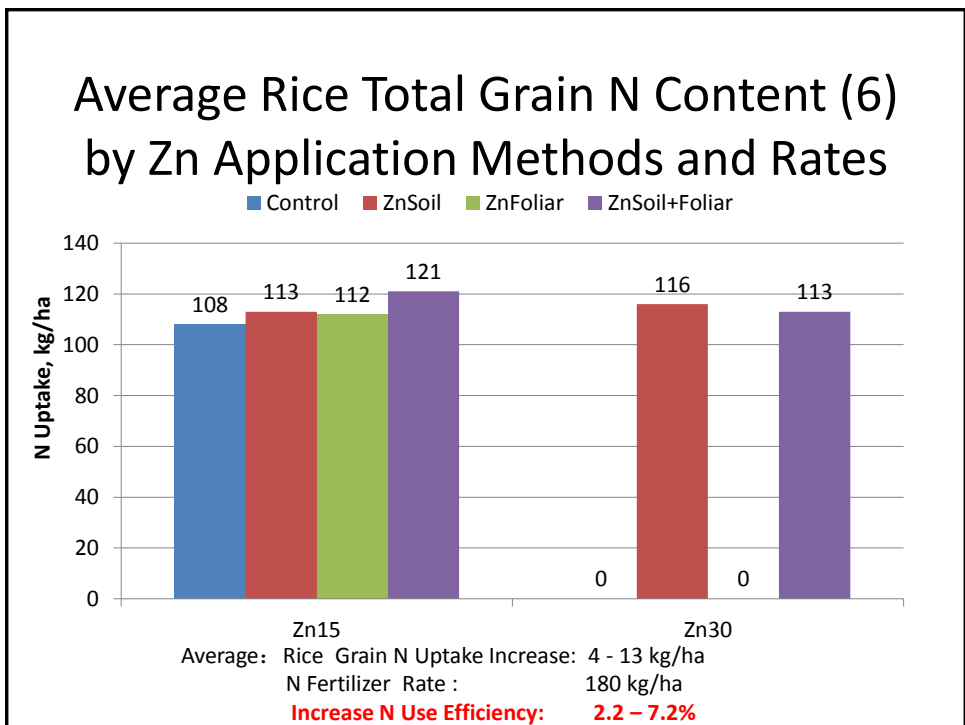
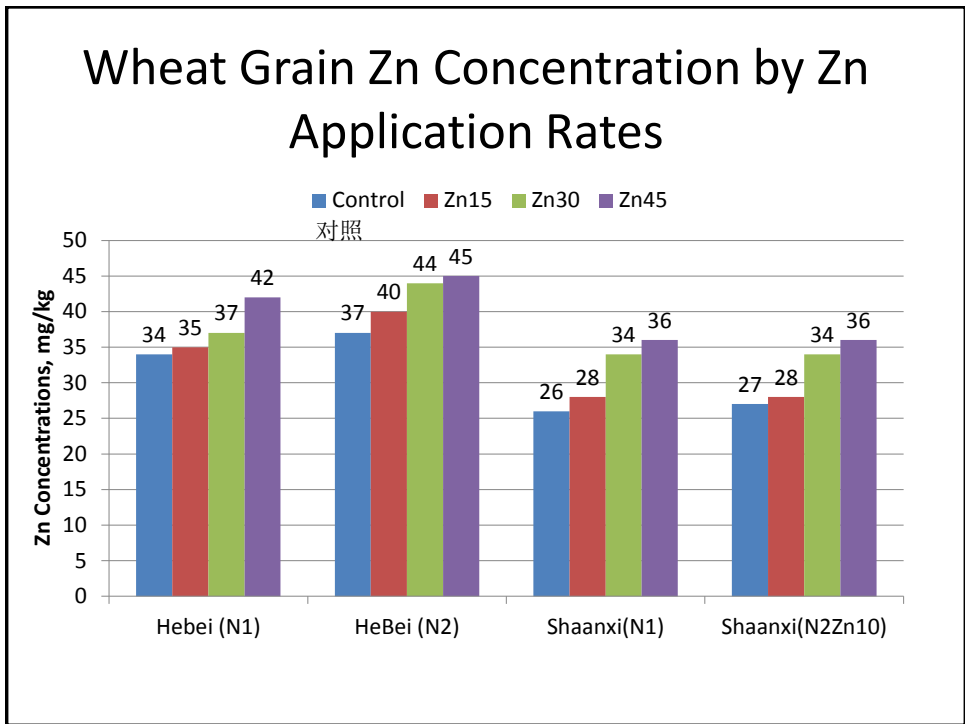


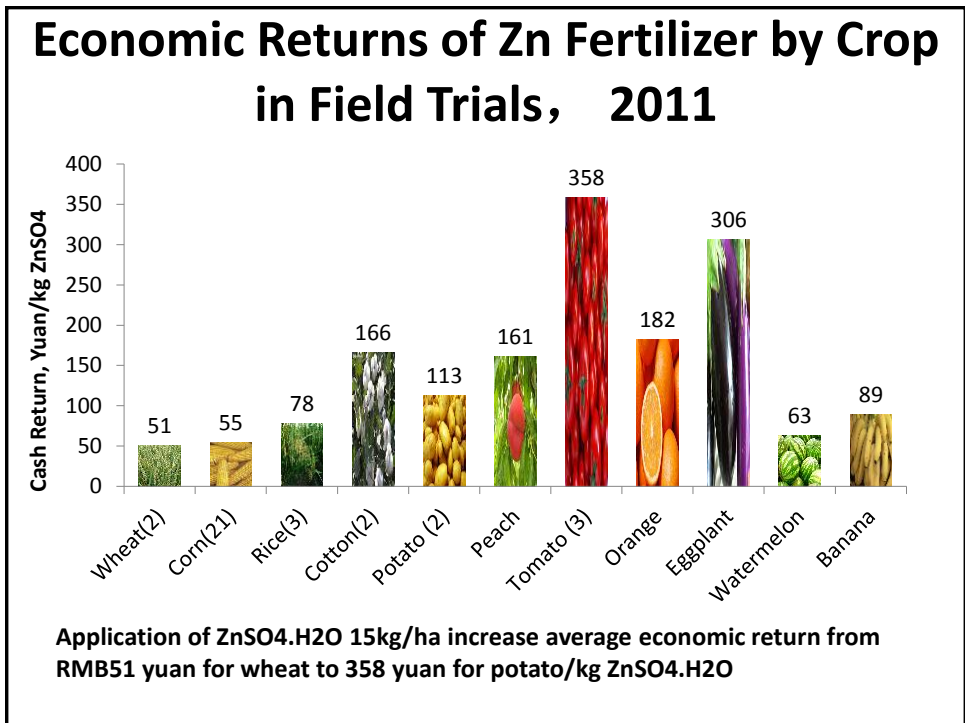
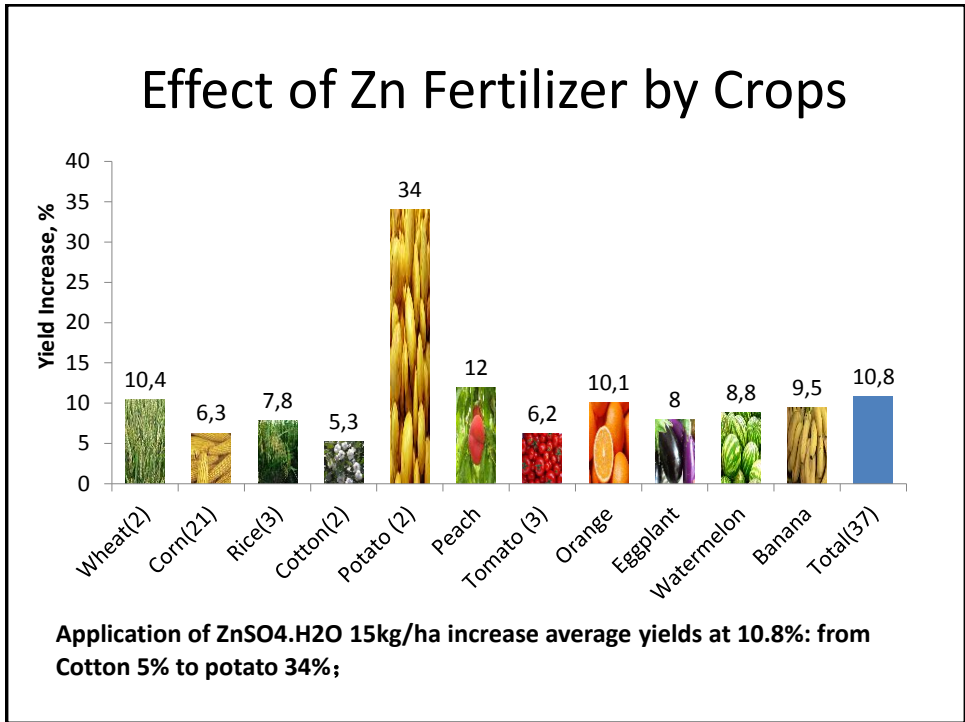
Effect of Zn Fertilizer by Province and Crop in Field Trials 锌肥对不同试验作物和地区 (省) 增产效应, 2011











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Fertilizer Industry Feed the Growing World with Nutritional Food





Creating a market premium for Zn-enriched rice: Bring high Zn nutritional food to people's table and high income to farmer

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MOA National Fertilizer Recommendation Guidelines, 2012

Zn fertilizer is included in the "MOA Fertilizer Recommendation Guideline for 2102 Spring Crop Production": For Rice, Cotton, Apple etc. crops Apply 1-2 kg ZnSO₄/mu (15-30 kg/ha) (March 28, 2012)

Zn Fertilizer is added to MOA Fertilizer Recommendation Guideline for 2012 Summer Crop Production": For Corn and Rice crops, Apply 1-2 kg ZnSO₄/Mu (15-30 kg/ha) (June 28, 2012)

Zn Fertilizer is recommended in the latest MOA Fertilizer Recommendation Guideline for 2012 Fall/Winter Crop Production": For Wheat, Apply 1-2 kg ZnSO₄/Mu (15-30 kg/ha); For Apple, Orange, Pear, Banana, Tea orchard apply 1-1.5 kg ZnSO₄/mu; For potato, 1-2 kg ZnSO₄/mu (15-30kg/ha) (September 27, 2012)

- If implemented, it will create Zn fertilizer requirement or potential market : 300,000 tpy

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New Zn Fertilizer Application Methods

Zn-enriched compound fertilizers – Adding Zn to acid macronutrient fertilizer granules by fully incorporating or coating Zn fertilizer into/onto NP/NPK fertilizer granules

Fertigation – Applying both Zn fertilizers and NPK fertilizers together in irrigation water to improve uniform distribution, homogeneous mixing, greater availability and reduced risk of damage to plants, esp. in semi arid and arid areas

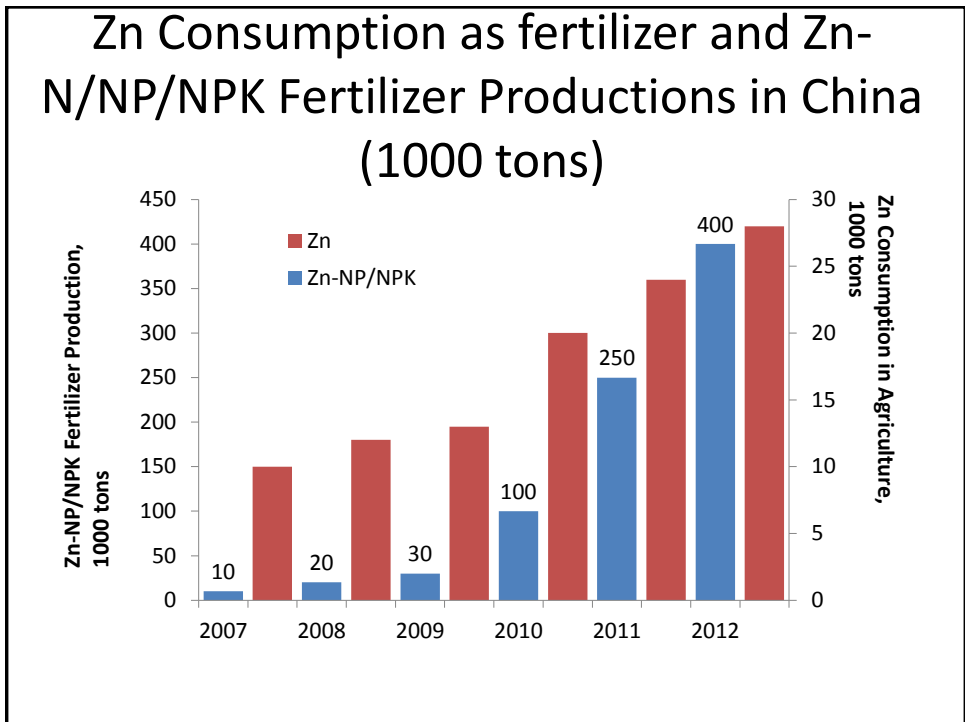
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Fertilizer Industry are actively engaged and motivated in Zn fertilizer production

- As result of ZNI China program, 6 new zinc Fertilizer Production Projects:

Sinofert: Zn-Enriched Urea:	60 kt/y;
Kingenta: Zn-Containing NPK Fertilizer:	100 kt/y;
Luxi: Zn-Enriched MAP:	50 kt/y
Luxi: Zn-Enriched NPK:	50 kt/y
Weng-fu Group: Zn-Enriched MAP:	140 kt/y
Zn-Containing NPK Fertilizer:	60 kt/y
Shenzhen Batian: Zn-Enriched NPK:	60kt/y
Total: 520,000 tpy	



国际锌协会锌营养成员和合作单位:
Zinc Nutrient Initiative Partners