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CRF IN CHINA ANDIMPLICATIONS ON THE CHINESE FERTILIZER MARKETS

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Fundamentals of Growth

CRF in China and Implications on the Chinese Fertilizer Markets

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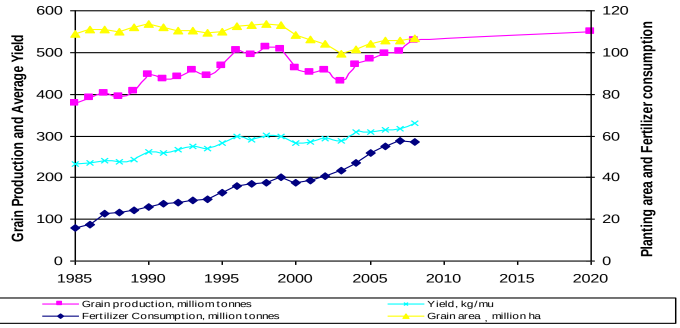
Current Situation

Drivers of Increased Grain Production

Drivers	Challenges
• Government 5 Year Plan • Self-sufficiency (95%) on Grains • Population Increase • Social Harmony – Commitment to Increase farmer's average income • Lifestyle change	• 700 Million+ Farmers • Farmland Acreage Decline • Limited Water • Less "sustainable" Labor Available for Farming • Environmental Capacity Limitation

- The Fertilizer industry must provide a sufficient quantity and quality of fertilizer at affordable prices for food production
- Socio-Economic pressures demand increased efficiency and less labor

Fertilizer Use has Increased, Grain Production has Not



Available planting area for grain has declined continuously
Grain production is "forecast" to increase 10% in next 10 years
Fertilizer application and/or efficiency has to increase to increase yield

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Fertilizer Market Snapshot

Million tons Nutrients	Actual Production		Production Capacity		Imports		Exports		Consumption	
	1998	2008	1998	2008	1998	2008	1998	2008	1998	2008
Nitrogen	22.7	43.3	28.7	49.6	1.4	0.1	0.1	2.7	24.4	39.8
Phosphate	6.9	12.6	8.5	18.4	3.0	0.1	0.2	1.4	9.7	11.1
Potash	0.5	2.8	0.6	3.1	3.5	3.3	0.2	0.1	3.6	6.3
NPK (Product)	22.3	51.8	N.A	60.0	8.1	0.6	0.2	2.8	29.9	49.7

Over Capacity in Urea and DAP/MAP Production
Import/ Export managed through Tariffs, Quotas, and License Permits

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China Now Imports Energy

- China Imported 200 MM Tons of Oil (52% of Total Consumption) in 2009
- China Imported 4.3% (120 MM tons) of 2800 MM tons total Coal consumed Just over 13% of global trading in 2009

Tight Energy Supplies → **Ever Higher Production Costs**

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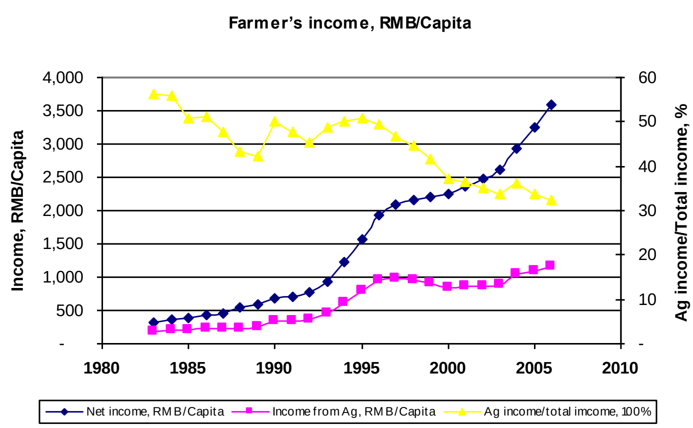
Farmers Income



More Farm Families are Working off the Farm → **Labor Becoming in Tight Supply**

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Eutrophication

Loss of nitrogen from farmland:

- $1740X10^3$ T/year in total
- $975X10^3$ T/year in Yangtze, Yellow and Pearl River Basins,

As a result:

- Among 131 lakes, 67 Eutrophication (51%)
- Dianchi, Tai-lake and Chaohu Lake are the three most seriously impacted.

Duan , 2000
Tu and Jin, 2001

Opportunities for CRF in China

- **All levels of Government promoting expansion of CRF**
  - Funds for R&D
  - Subsidies
- **5 Year Plan**
  - Increase Farmers Income
  - Increase Productivity
  - Decrease Pollution

Rapid "In Country" Development

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Current CRF Market – Large and Growing

- Companies Producing CRF's in China Between 70 - 200 companies
  - Top 7 producers ~4.8mm tons in 2008
- Current Capacity of CRF's in China Reported as much as 7mm tons
- Past CRF production was Urea Condensates or Nitrogen Inhibitors
- Recently more Coated Products have been introduced (Older Technologies)

Ever Increasing Environmental Restrictions

Increasing Pollution → **Ameliorated with CRF**

Current CRF Market
Complex & Fragmented

- No Reliable Data on Consumption
  - Thought to be between 1mm and 1.75 mm tons
- Value equation for Farmer not Yet Positive
  - Increasing farmers income through the use of CRF in broad acre agriculture not yet achieved
    But is positive for hi-value and cash crops
- Over 75,000 Distributors and Retailers
- Regional Governments often "sponsor" local producers

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75K Fertilizer Retailers are Generally Small and Largely Unaffiliated


Nanning, China - 2009

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Outlook for Chinese Fertilizer Market & Controlled Release Fertilizer Industry

- **For the Fertilizer Market**
  - Government will continue to influence market, supply and incentives to achieve policy objectives
  - Over capacity will worsen with slim prospects for significant resolution
    - Consolidation will continue but with limited impact on overall efficiency
  - Demand will experience growth but still not to the level to achieve scientifically derived and balanced fertilization
  - Risk of price adjustment for raw materials particularly gas

Which will Directly have Impact On:

- **Controlled Release Fertilizer**
  - Large growing opportunity
    - Declining Labor Pool
    - Increasing Fertilizer and Crop prices
  - No current profitable solution for broad acre farmers
    - Grain crop farmers continue to be price sensitive and risk averse
  - Continues to be dominated by local companies