

2013 IFA Asia Crossroad Conference
Bali(Indosnesia), 7-9 Nov. 2013

Evolution of fertilizer-related policies in China- impact on fertilizer industry

Fusuo Zhang, Weifeng Zhang, Haofeng Li and Gaoqiang Huang, Yuxuan Li, Tingyu Li, Dan Zhang, Ying Feng, Shuai Wang, Guangge Ding, Huan Wang



China Agriculture University



Key messages

Social economic evolution: planning economy to market economy

Important events: opening policy---joining WTO

Fertilizer policy: all from government to dual systems

Society demand: enough to eat---safety, nutritional, environmental friendly food

Farmer and farming evolutions: something to do---business

Outline

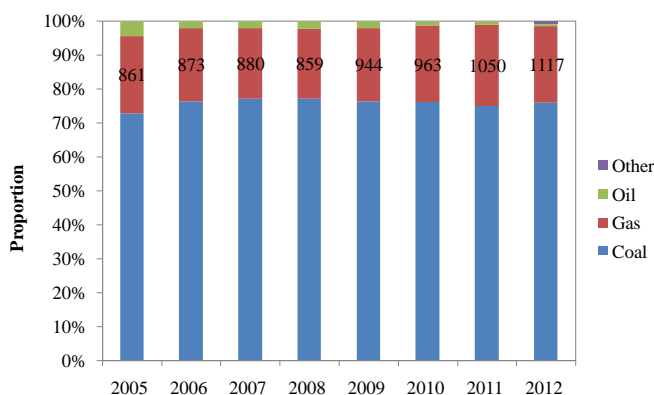
- Policies related to fertilizer production and distribution
- Subsidies to lower fertilizer price (for producers and distributors)
- Subsidies to increase fertilizer affordability and to improve use efficiency (for farmers)
- Summary and perspective

1. Policies related to fertilizer production and distribution

- 1.1 Policies for management of resources
- 1.2 Policies for construction of new facilities
- 1.3 Trade policies
- 1.4 Environment policies

1.1 Resource management- Natural gas

Natural gas was restricted to be increased in fertilizer production Since 2005;
 Since Oct. 14, 2012, it was forbidden to 1) enlarge N fertilizer production capacity of natural gas- base facilities, 2) change feedstock of N fertilizer from coal to natural gas, 3) build up new facilities based on natural gas.



<http://www.sdpc.gov.cn/search/searchresultnew.jsp>

1.1 Resource management- P rock

Since 2004, tax for mining P rock was increased from 0.5Yuan/ tone to 3Yuan/ tone in Yunnan province;

Since 2005, Yunnan province initiated some restrictions to control miner of P rock;

Since 2005, Hubei province requested the small miner to update technologies, otherwise it had to be closed;

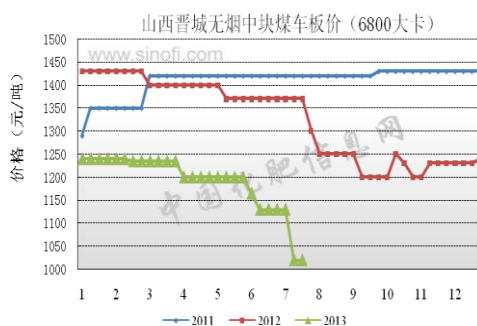
Since Oct 1st 2008, P rock mining tax was increased from 3Yuan/ tone to 15 Yuan/ tone. But this policies did not distinguish high grade and lower grade rock, which led to much waste of lower grade rock.

Since Jan 1st 2013, P rock tax was changed from 15Yuan/tone to 10% of sale price in Hubei province.

	2003	2012
Production of P fertilizer (10000 tone P ₂ O ₅)	908.5	1693.3
Share of top 10 plants (%)	28%	50%
P recovery rate of rock (%)	45%	61%
P rock consumption (10000 tone rock)	5437.8	13470.9

1.1 Resource management- Coal price

Since Feb 1st 2006, central government removed price control for coal used for fertilizer production.



<http://www.fjjg.gov.cn/fjwj/jgfw/qsjgzc/webinfo/2005/03/1187774409636487.htm>
http://www.sdpc.gov.cn/zcfb/zcfbtz/tz2006/t20060217_59816.htm

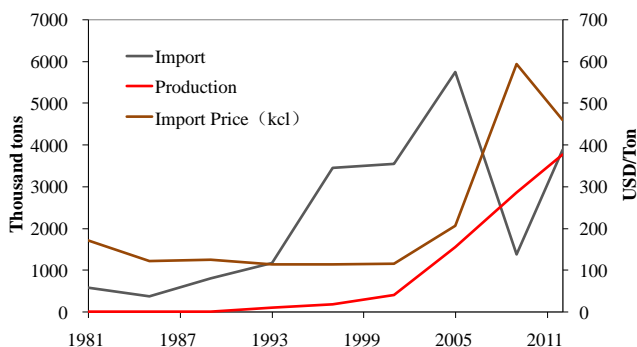
1.2 Trade management- import

Item	2011	2012
Sulfur	3%	1%
P rock		0%
Other fertilizer		1%
Urea\ DAP\ NPK		Within quota: 1% Out of quota: 50%

		2011	2012	Change (%)
Amount imported (10000 tone)	Sulfur	952.0	1060.0	11.3
	Urea	0.2	17.1	8235.0
	DAP	9.3	16.0	71.6
	NPK	101.8	131.9	29.5
	P rock	0.01	0	/

1.2 Trade management- *K fertilizer import*

Since 2004, 11 enterprises were allowed to import K fertilizer under control of CHINA CHAMBER OF COMMERCE OF METALS, MINERALS & CHEMICALS IMPORTERS & EXPORTERS(CCCMC). But a collaborative mechanism was not well established among these enterprises. It resulted in a fast increase of imported price, but gave great chance for civil production to development.



1.2 Trade management- *export*

i.e. Urea export policies changed from encourage export- restrict export to partly allow export

Yea	Date period	Tax rate
2004	Mar 16 th	Stop tax exemption
	Jan 1 st –Mar 31 st	Tax rate 260 Yuan/tonne
2005	Jun 1 st –Oct 31 st	Tax rate 30%
	Nov 1 st – Dec 31 st	Tax rate 15%
2007	Jan-Sept	Tax rate 30%
	Oct-Dec	Tax rate 15%
2008	Jan-Mar	Tax rate 30%
	April-sept	Tax rate 35%
	Oct-Dec	Tax rate 25%
2009	Jan, Jul, Aug, Nov 16 th –Dec 31 st	Tax rate= (1.1-base price/ real price) × 100%, base price: 2300Yuan/tonne
	Feb- Jun, Sept 1 st – Nov 15 th	Tax rate 110%
2010	Jan, Jul 1 st –sept 15 th , Nov 16 th –Dec 31 st	Tax rate= (1.07-base price/ real price) × 100%, base price: 2300Yuan/tonne
	Feb- Jun, Sept 16 th – Oct 15 th	Tax rate 110%
2011	Jan- Jun, Nov-Dec	Tax rate 110%
	Jul- Oct	Tax rate= (1.07-base price/ real price) × 100%, base price: 2100Yuan/tonne
2012	Jan- Jun, Nov-Dec	Tax rate 110%
	Jul- Oct	Tax rate= (1.07-base price/ real price) × 100%, base price: 2100Yuan/tonne

1.2 Trade management- *export*

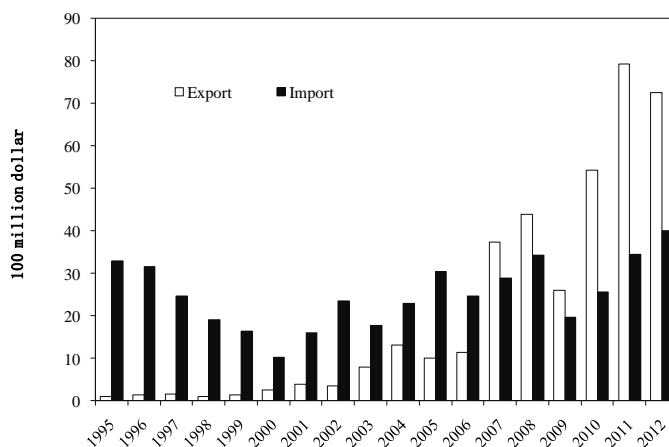
- Since 2009, China restricted P rock export by quota system. The quota number and real export amount show as table below:

Table. P rock export quota and real export amount from 2008 to 2014 (10000 tone)

Year	Quota	Export amount
2008	-	180
2009	150	38
2010	150	88
2011	150	64
2012	120	47
2013(Jan-Sept)	100	25
2014	100	-

Changes of Chinese fertilizer trade

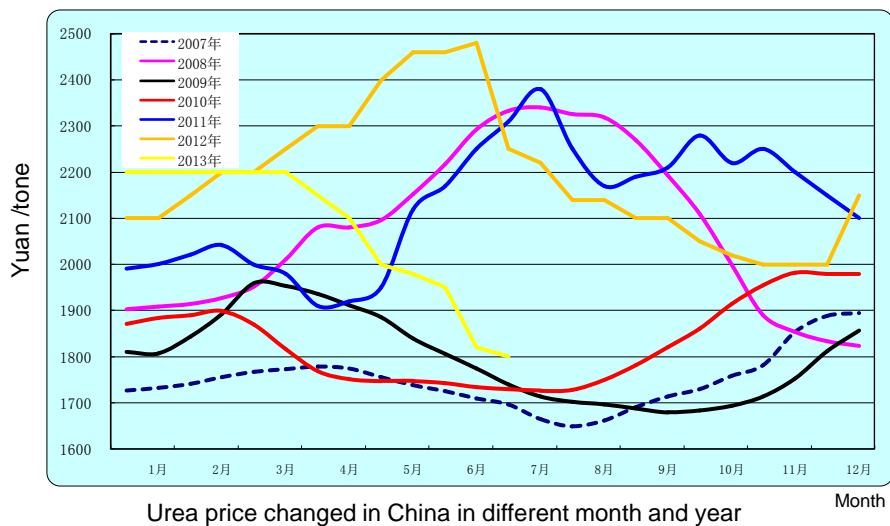
Fertilizer trade is regulated by seasonal tariffs from government

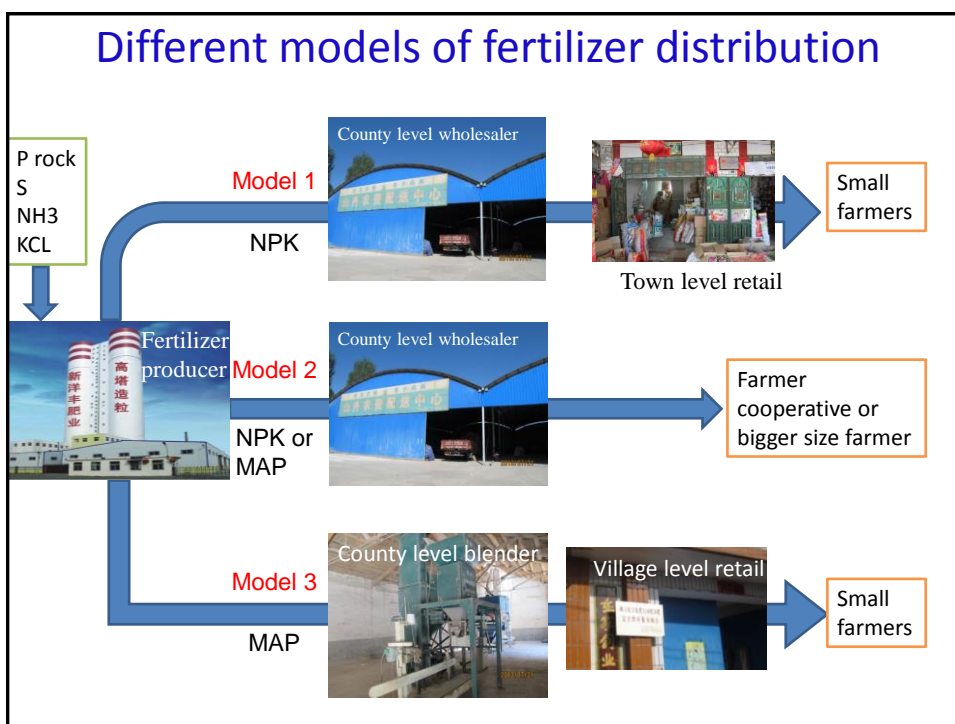


1.3 Civil market management- for sellers



Price fluctuation led to reduction of fertilizer storage by wholesalers and farmers





1.4 Environmental management- for new facility

Since Aug. 2011, policy to protect P rock resources and energy use efficiency by restricting miner size and technologies has been released. For example, energy use efficiency for ammonia had to be lower than 1800 kg ce/t if low quality coal was used.

Since Sept. 2011, new facilities to produce DP (DAP and MAP) and N nitrogen fertilizer were subjected to environmental standard. It was not allowed to build up new facility in ecological fragile regions, and the waste disposal must be within the standard.

Standard for waste disposal in P fertilizer production


Waste water disposal: $\leq 0.2\text{m}^3/\text{t}$

P content in waste water $\leq 15\text{mg}/\text{l}$

F content in waste water $\leq 15\text{mg}/\text{l}$

Ammonia content in waste water $\leq 15\text{mg}/\text{l}$

Particle in gas $\leq 80\text{mg}/\text{Nm}^3$



主办单位：中国科学院 中国工程院 国家自然科学基金委员会
 2010年3月25日 星期二
 庚寅年正月十七 第3468期 今日八版
 网址: http://www.scientist.cn 国内统一刊号: CN11-0204 邮发代号: 1-12 中国科学院主办 科学出版社出版
 保守估计, 如能革新化肥产业, 到2020年可以减排1.4亿吨二氧化碳, 约占全国能源领域减排目标12亿吨的12%。
挖掘化肥产业的巨大减排潜力
 山东报道员 王丹

The government realized that N fertilizer is a main contributor to greenhouse gas emission in China.

In 2009, President Hu announced to reduce GHG emission by 40-45% in next two decades. In 2010, government gave a specific target for each industry. It was the first time to control electricity supply for N fertilizer production in that year, which resulted in a reduction of fertilizer production.

Products	Production during Jan-Oct in 2009	Production during Jan-Oct in 2009	Increased
	10000 tone		%
Urea	2439	2253	-7.6
Ammonia	4260	4187	-1.7
Nitrogen fertilizer (N)	4026	3913	-2.8

(NSB and Fertilizer Network)

2.Subsidies to lower fertilizer price (for producers and distributors)

- 2.1. Price control for electricity and nature gas in fertilizer production
- 2.2. Price control for transportation of fertilizer
- 2.3. Exemption of value added tax
- 2.4. Subsidies for fertilizer storage

2.1 Electricity price for fertilizer production

Government gives special price for energy used for fertilizer production, which includes nitrogen, phosphate, potash and compound fertilizer.

Since 2006, commercial organic fertilizer was included.

The price for fertilizer production also increased in recent years, but less than for other commodities.

Electricity price changed in China (Yuan/kwh)

Year	Price for fertilizer production	Price for the other industry
1997	0.1763333	0.262
2003	0.3014	0.471
2004	0.312	0.480
2005	0.2998	0.505
2006	0.3006	0.509
2007	0.3006	0.506
2008	0.2998	0.5188
2009	0.3226	0.5333
2010	0.3226	0.5333
2011	0.2953	0.5359

2.1 Natural gas price for fertilizer production

Natural gas used for fertilizer production was controlled by quota and special price. The special price within quota is about half of price out of quota.

Because the price increase and limited quota, ammonia cost increased by 390-650Yuan/tonne since 2005. Compare to the other industry, fertilizer industry was supported much more by governmental subsidies.

(Yuan/1000m³)

Date for execution	Price for fertilizer	Price for other industry
Dec, 26, 2005	690	875
Nov, 10, 2007	690	1275
Jun, 1st, 2010	920	1505
Oct, 1st, 2012	1340*	1980*
July, 10, 2013	1340*	2143

*This is government reference price for Sichuan province, which include 13% VAT but did not include pipe transportation fee.

Within this reference price, the supplies and users can discuss the real price.

2.2 Railway transportation price for fertilizers

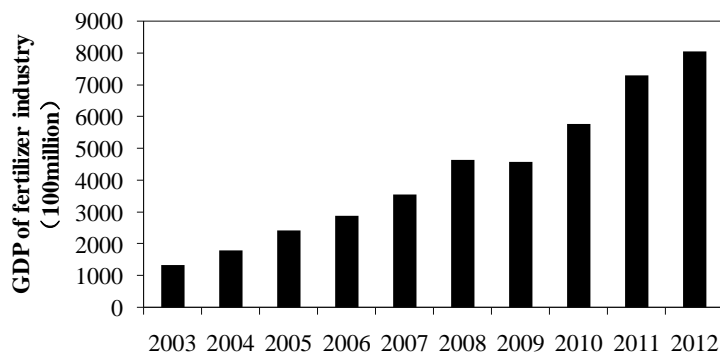
- Railway transportation fee include four parts: base price, electricity fee, new road fee, and railway construction funding.
- Government gave special base price and exempted railway construction funding for chemical fertilizer before 2009, which covered about 20 kinds of chemical fertilizer s (excluding commercial organic fertilizers).
- Since 2009, fertilizer was classified into NO.2 commodity category, which means no subsidy for fertilizer transportation additionally.

Table, base price of railway transportation for fertilizer and NO.2 commodities

Changed time	Cost for 2000km	Price for fertilizer		Price for NO.2 commodities	
		Base price 1	Base price 2	Base price 1	Base price 2
Jun,1st,1997		4.2	0.0257	4.2	0.0239
July 1st, 2000	42.6	4.2	0.0192	5.2	0.0239
16-Dec-03	46.8	4.2	0.0213	5.6	0.03
10-Apr-06	55.6	4.2	0.0257	6.3	0.0329
5-Nov-07	59.6	4.2	0.0277	6.3	0.0349
July, 1st, 2008	65.4	4.4	0.0305	6.3	0.0349
July, 1st, 2009	82	6.4	0.0378	6.4	0.0378
Dec,13,2009	93.2	6.8	0.0432	6.8	0.0432
April,1st,2011	95.8	7	0.0444	7	0.0444
May, 20,2012	108.2	7.8	0.0502	7.8	0.0502
Feb,20,2013	138.1	7.9	0.0651	7.9	0.0651

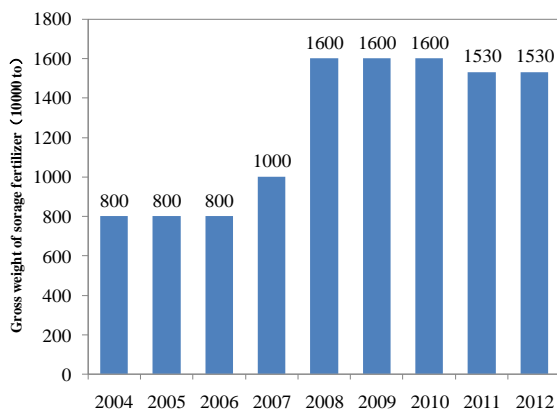
2.3 Tax exemption for fertilizer

- Commonly, value added tax rate should be as high as 13% or 17% in China.
- But it was exempted for chemical fertilizer production and distribution.
- Since Jun 1st 2008, commercial organic fertilizer producer and distributor were also included in this category.



2.4 Storage policies for adjustment of fertilizer transportation and price fluctuation

Producers and distributors were allowed to apply quota for fertilizer storage for the off-season (6 month). Government will exempt part of loan interest. Totally, this subsidy is around 1 billion Yuan annually.



Government subsidized fertilizer storage from 2004-2012

中央财政贴息化肥淡储					
2013年9月数据		2012年9月数据		2011年9月数据	
截至2013年8月		截至2012年8月		截至2011年8月	
1000万吨以内产能企业		1000万吨以上产能企业		1000万吨以上产能企业	
省、市	冬储存储量	冬储存储量	冬储存储量	淡季储备量	合计
河北	25	50	20	12	107
山西	20	10	5	5	40
内蒙古	15	40	10	40	105
辽宁	30	70	30	10	140
吉林	35	80	20	15	150
黑龙江	30	85	25	15	155
江苏	15	40	10	5	70
浙江	8	15	5	2	20
江西	15	40	10	5	70
安徽	30	45	5	4	84
山东	45	70	25	24	164
河南	40	60	15	6	121
湖北	20	45	5	5	75
湖南	20	35	10	5	70
广东	5	30	5	5	45
广西	25	30	5	5	65
福建	10	20	5	5	40
四川	20	30	15	5	70
贵州	10	20	5	5	40
云南	10	10	5	5	30
重庆	15	20	5	5	45
陕西	15	25	5	4	49
甘肃	10	15	5	4	34
宁夏	5	12	5	2	24
青海	3	7	5	5	20
新疆	25	35	15	14	79
海南	5	5	5	5	20
上海	5	5	5	5	20
西藏	2	2	2	2	8
全国	905	1025	200	100	1320
冬储存储量合计 1730万吨		淡季储备量合计 100万吨		合计 1830万吨	

Fertilizer storage in different regions in 2013

2.5 Subsidies for animal waste treatment

- Until 2012, China has built 25000 medium and large size, and 40 million small household biogas facilities. During 2000-2012, the total government investment was 24.8 billion Yuan.
- Until 2012, China has 3107 commercial organic fertilizer enterprise, which produced 23.4 million tone of products.



Government subsidized 45%、35% and 25% for west, central and east China. The total amount of subsidy did not exceed 2.5、2.0 and 1.5 million Yuan. Local government was required to subsidize more than 5%、10% and 20%.



Government subsidized 2000 Yuan、1600Yuan and 1300 Yuan for west, central and east China.



Shanxi province gave 1 million Yuan for each organic fertilizer plant. Wuhan city gave 0.35 million Yuan for each bio-organic fertilizer plant.

3. Subsidies to increase farmers' affordability and use efficiency

- 3.1 Increase farmers incomes or compensate fertilizer price rise
- 3.2 To improve adoption of best nutrient management technologies
- 3.3 To improve adoption of other crop production technologies

3.1 More and more agricultural subsidies in recent years

In 2003, totally 39 policies have been conducted to improve agricultural development and to increase farmers' income.

Name	Start time	Accumulated funding till 2010 (billion Yuan)	Implementing
Grain subsidy	2004	118.7	For grain growers based on grain sown area
Chemicals input subsidy	2006	336.6	Direct to farmers in order to defend high fertilizer price
Removing Tax	2006	-300.0	Stop to levy taxes from farmers
Seeds subsidy	2004	87.23	Direct to farmers for high quality crop seeds
Agriculture machine subsidy	2004	52.97	Subsidy 1/3 price of Agriculture machine
Protecting Price	2006		Government will buy grain if market price is lower than a risk level

Subsidies for farmers- to increase farmers' income

Subsidies for grain targeted on all grain crops;

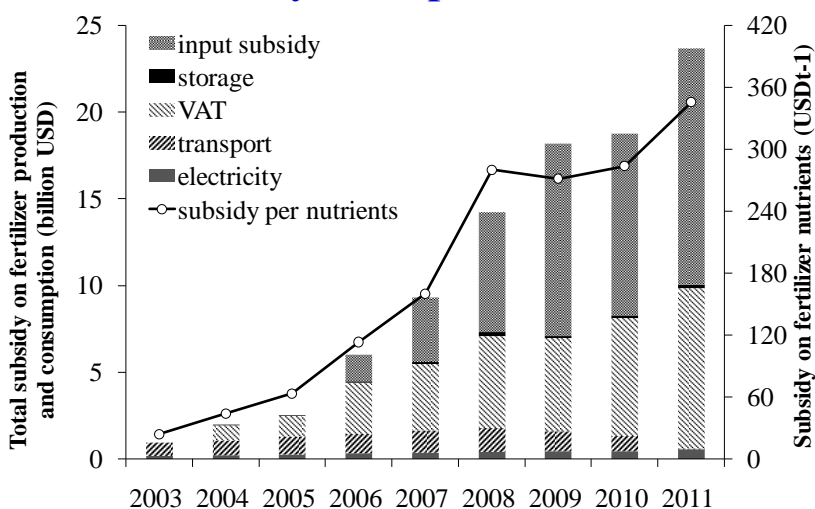
New variety include 10 crops : wheat\maize\rice\soybean\cotton\potato\highland barley\peanut\some animals, 10 Yuan/mu for farmers;

Machinery include: 175 kind of machines;

(100 million Yuan)

Year	Subsidies for grain	Subsidies to compensate fertilizer and diesel price	Subsidies for new variety	Subsidies for machinery
2013	151	1071		
2012	151	1078	220	215
2011	151	860	220	175
2010	151	716	154.8	155
2009	190	756	198.5	130
2008	151	638	123	40
2007	151	276	66	20
2006	142	120	42	6
2005	135	0	39	3
2004	116	0	29	0.7

Main subsidy for fertilizer industry (electricity, transportation, VAT)



Li Yuxuan et al., 2013 JEQ

3.2 Subsidies for machinery related to fertilizer application



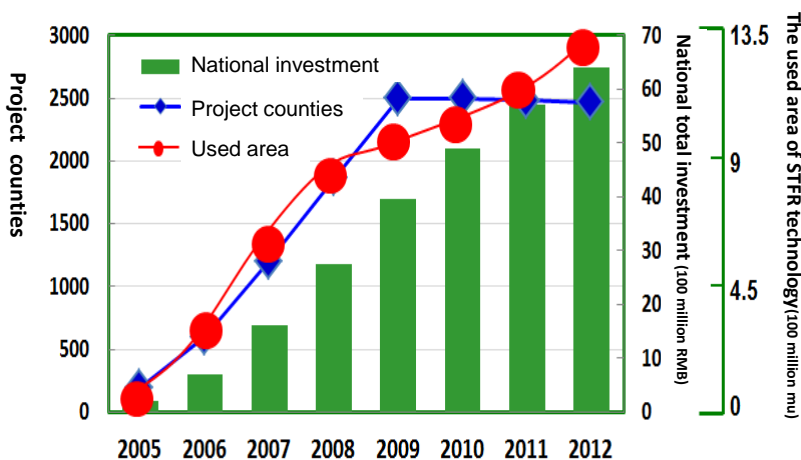
Subsidy about 30% of price



Subsidy for well construction, facilities

3.2 National Program for Soil Testing and Fertilizer Recommendation (started from 2005 till now)

In last 9 years, totally 7.1 billion RMB has been invested to cover all agricultural areas (totally 2498 counties). The technology has been used on more than 9 million ha cropland



3.2 Subsidies for new technologies such as computer service systems and NPK blenders

New policies in 2013: NPK products do not need registration or allowance which was produced by small machine with annual production capacity lower than 20000 tone or 2.8 tone/ hour and which directly be send to farmers.



3.2 Subsidies for increasing soil organic matter

Statistics (10000mu、10000Yuan)

		2008	2009	2010	2011	2012	Sum up
Crop straw returning	Counties Number	35	150	336	271	454	1246
	Area	250	1200	1969	2578	4648	10645
	Budget	5000	24000	39380	51560	69600	189540
Green fertilizer	Counties Number		24	137	120	120	401
	Area		80	372	372	312	1136
	Budget		1600	7440	7440	4680	21160
Organic fertilizer	Counties Number		76	147	30	1	254
	Area		220	409	158	8.5	795.5
	Budget		4400	8180	3160	170	15910
Soil remediation	Counties Number				78		78
	Area				156.8		156.8
	Budget				7840		7840
Fertility improvement	Counties Number					76	76
	Area					184.6	184.6
	Budget					5550	5550
Total	Counties Number	35	250	620	499	651	2055
	Area	250	1500	2750	3264.8	5153.1	12917.9
	Budget	5000	30000	55000	70000	80000	240000

注：数据来源于全国农技推广服务中心

3.2 Subsidies for commercial organic fertilizers

Area	The subsidy period	Amount of money(Yuan/ton)	The subsidy period	Amount of money(yuan/ton)
Shanghai City	2004-2008	250	2009-	200
Jiangsu Province	2006-	200		
Wujiang of Jiangsu Province	2009	150		
Xuzhou of Jiangsu Province	2011	150		
Beijing City	2007-	250		
Shandong Province	2008-	300		
Jinhua of Zhejiang Province	2008-2009	200	2010-	300
Hangzhou of Zhejiang Province	2011	300		
Lanxi of Zhejiang Province	2011-	300		
Jiangshan of Zhejiang Province	2013	200		
Panyang of Liaoning Province	2007	400		
Jilin Province	2010	300		
Mengjin of Henan Province	2009	200		
Liuyang of Hunan Province	2010-2012	200		

3.2 Subsidies for foliar application of fertilizers

Special subsidies for foliar application of fertilizer on winter wheat in later growth stage to defend heat\ logging and increase yield.

In 2012, 800 million Yuan for winter wheat;

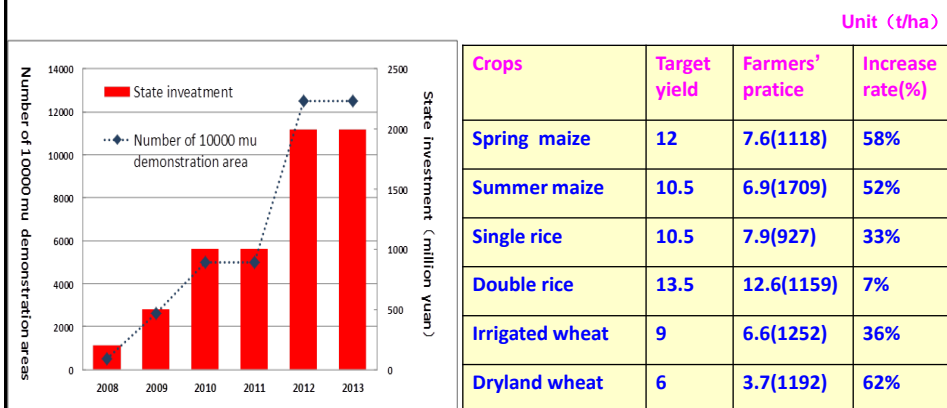
In 2013, 1700 million Yuan for winter wheat;



Photo from Jingyuan Xia

3.3 National Program of High Yielding Grain, Cotton, Oil and Sugar Crop Production (since 2008-)

In last 6 years, totally 6.7 billion RMB has been invested in to set up 12500 “10000 mu demonstration areas” .



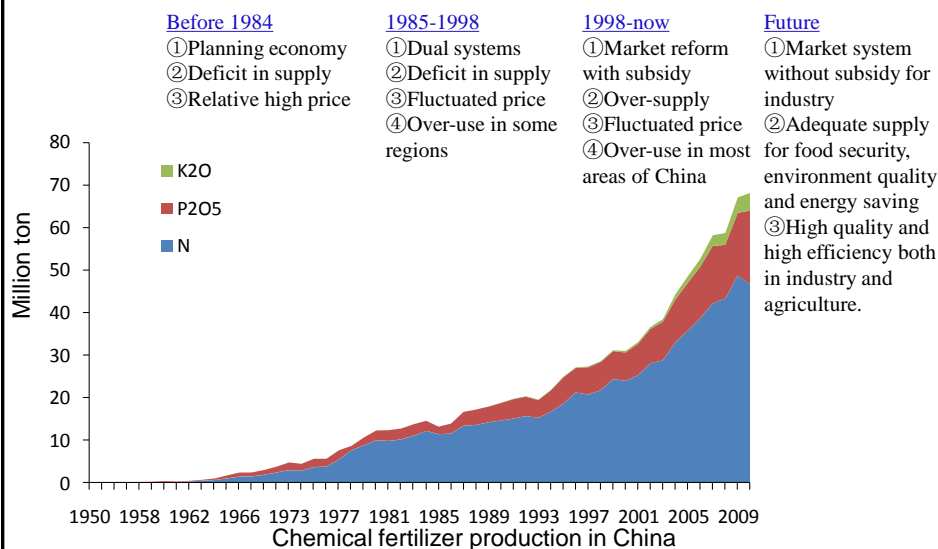
Note:10000 mu=667 hectare; Farmers' practice from farmer survey, including 7357 households in 2008-2009.

3.3 Regional subsidies for land consolidation

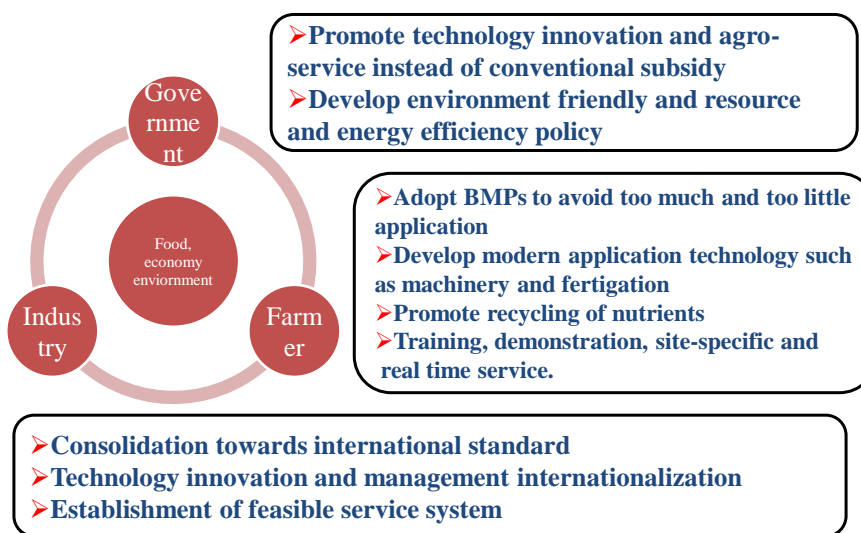
Regions	Requirement	Subsidies
Tengzhou, shandong province	>50 mu	100 Yuan/ mu to landlord
	50~100 mu	100 Yuan/ mu to tenant
	100-300mu	200 Yuan/ mu to tenant
	>300 mu	300 Yuan/ mu to tenant
Wuhan, Hubei province	≥1000 mu	50 Yuan/ mu to tenant
Nanning, Guangxi province	≥500 mu	200Yuan/ mu to tenant
Jiaxing, zhejiang province	≥ 100mu, more than 5 year	200Yuan/ mu to tenant
	≥300mu, new farmer cooperatives	20000 Yuan/ household

推进农村土地适度规模经营扶持政策

4.1. Summary of policy changes



4.2. Perspectives for an integrated nutrient management policy scheme in China



Acknowledgments
NSFC, MoA , MoE, MOST



Thanks
for your attention !



Plant Nutrition
CAU, Beijing, China



中国农业大学植物营养研究生和老师合影
2009.6.14