

Effect of Energy Price Rise on Agriculture in China

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China is Becoming a Major Energy Consumption Country in the World

Since the 1980s, as China's economy gain stable and sustainable development. The annual GDP growth rate has been maintained at about 8%.

However, China with a population of 1.3 billion is becoming one of the major energy consumption country in the world during the process of economic development.



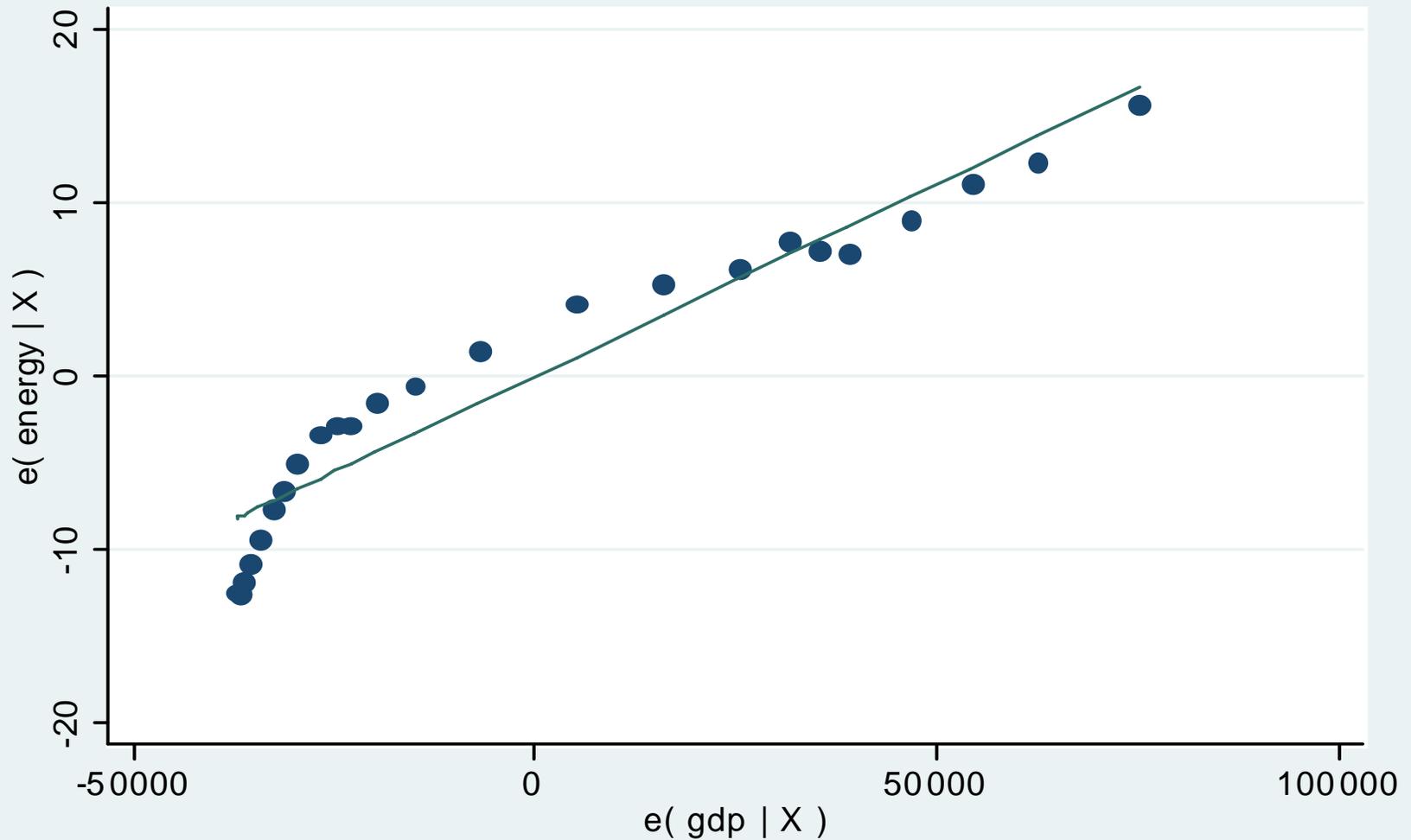
From a Kingdom of Bicycle to Car



The Consumption of Energy and GDP in China

	ENERGY (Million tce)	GDP (Billion US\$)
1980	602.8	56.5
1985	766.8	112.4
1990	987.0	232.5
1995	1311.8	718.7
1997	1381.7	914.3
1998	1322.1	962.1
1999	1301.2	1007.2
2000	1303.0	1103.2
2001	1349.1	1196.6
2002	1482.2	1299.2
2003	1709.4	1459.3

Regression results of the national energy consumption with GDP



coef = .00022168, se = .0000139, t = 15.95

Reasons to make China become a major energy consumption country

- 1、 Industry production development has used increasingly more energy;
- 2、 Traffic and transportation industry development has used a lot of energy;
- 3、 Use of energy by agricultural sector is continuously increasing;
- 4、 Changes of living method by the consumers;
- 5、 International trade increase;
- 6、 Development of commerce.



Energy Consumption in China (10000 tons of tce)

	1990	1995	2000	2002	2003
Industry	67,578	96,191	89,634	102,181	119,627
Transport, Storage, Post	4,541	5,863	9,916	11,087	12,740
Wholesale, Retail Trade	1,247	2,018	2,893	3,464	4,116
Agricultural Sector	4,852	5,505	5,787	6,514	6,603
Residential Consumption	15,799	15,745	14,912	17,033	19,268
Others	4686	5,853	7,155	7,942	8,589
Total Consumption	98703	131,175	130,297	148,221	170,943

资料来源：中国能源统计年鉴。

Civil automobile has used a lot of energy

- In 2000, China owns a total number of 16.1 million cars and it increased to 26.99 million in 2004; in 2005, the civil automobile in China had exceeded 30 million.

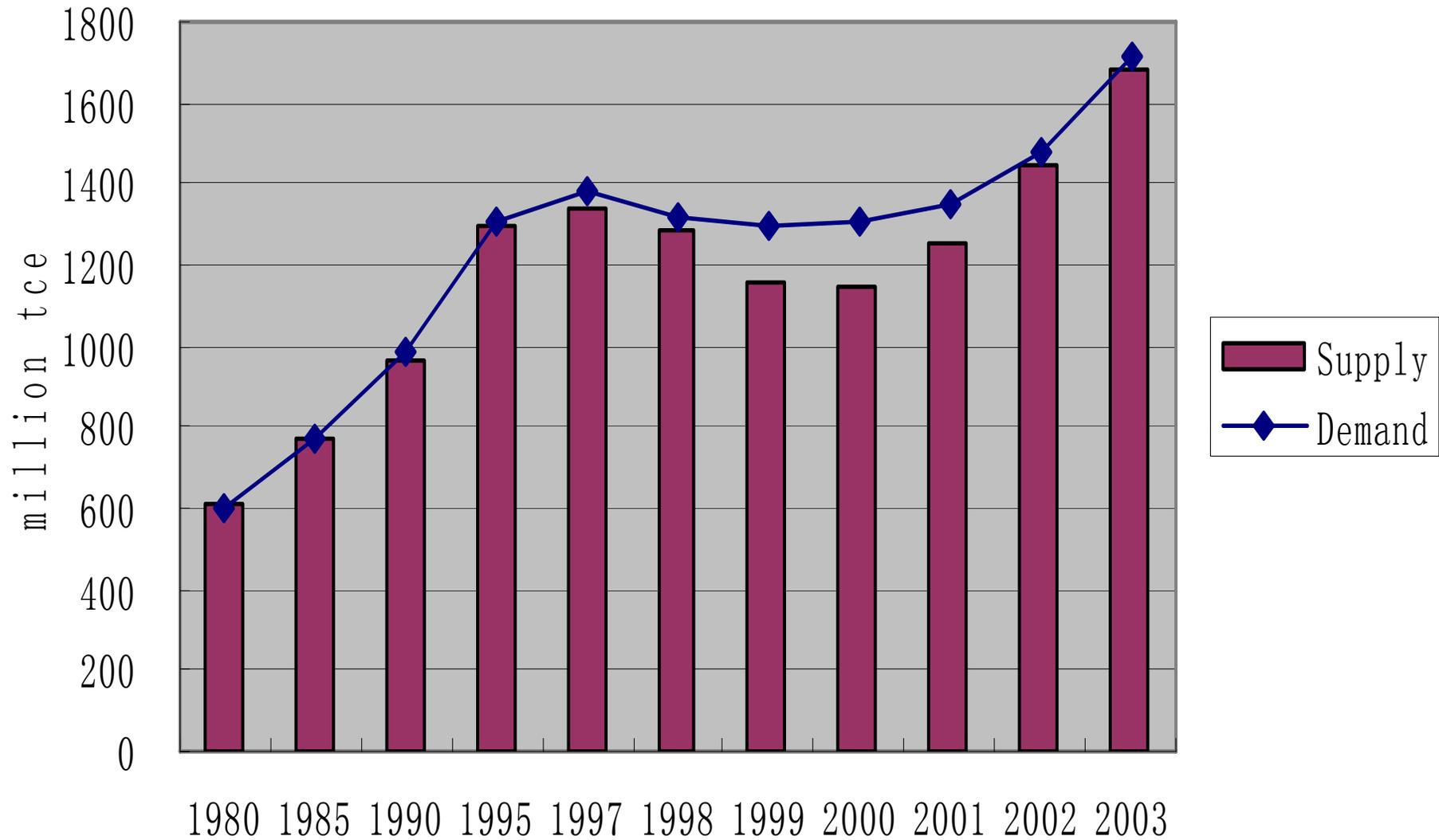


Energy supply in China exists a shortage

- Since 1990s, the energy demand in China started to exceed energy supply. In 1990, the gap of energy supply is short of 25.7 Million tce, in 2000 it had increased to 151.5 Million tce, and in 2003 the shortage was 24.5 million tce.



Energy Supply and Demand in China

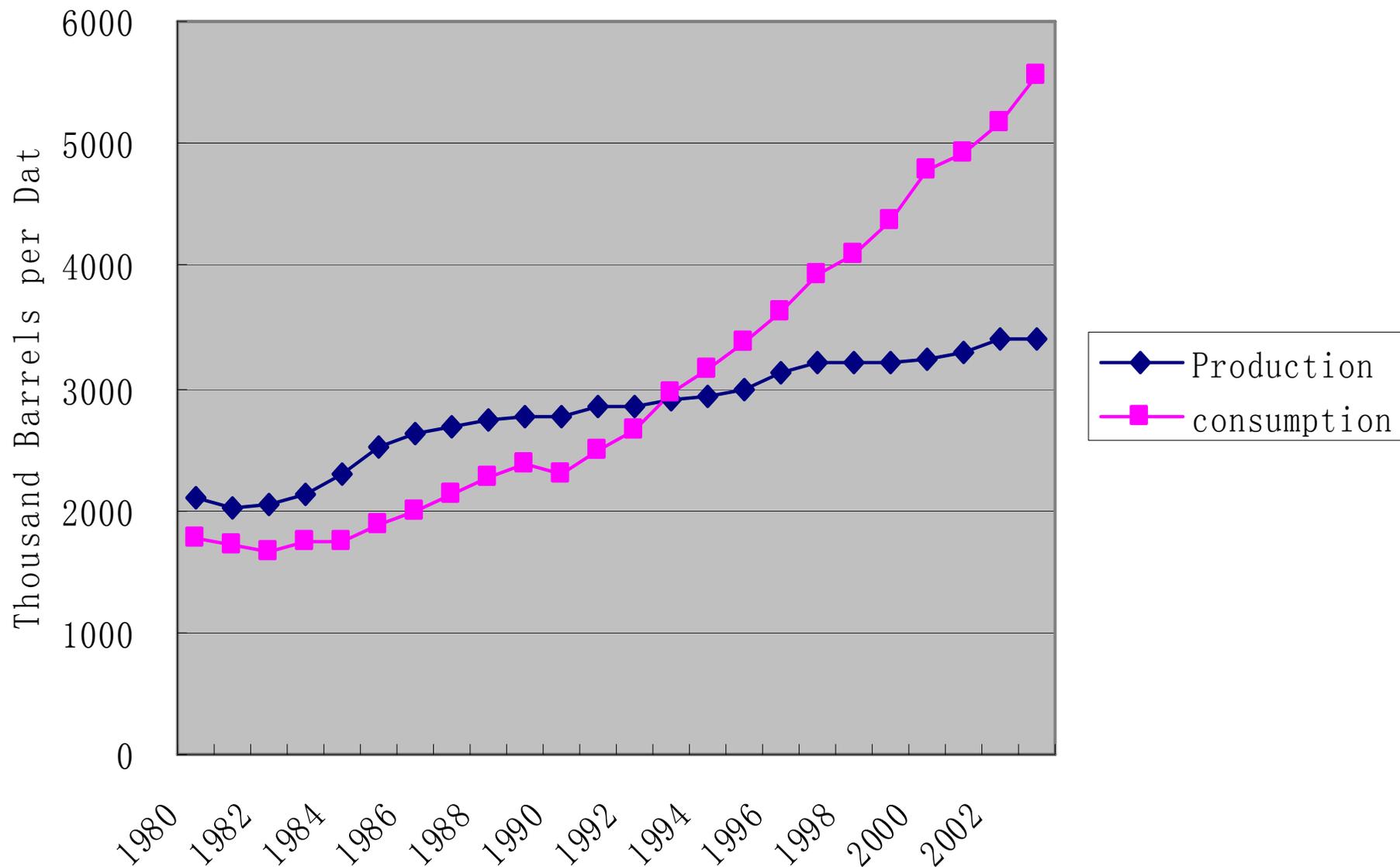


Production and consumption of petroleum

- Since 1992, the demand for petroleum in China has started to exceed supply, and the China has become a major petroleum import country from a petroleum exporting country.



The production and Demand of petroleum in China

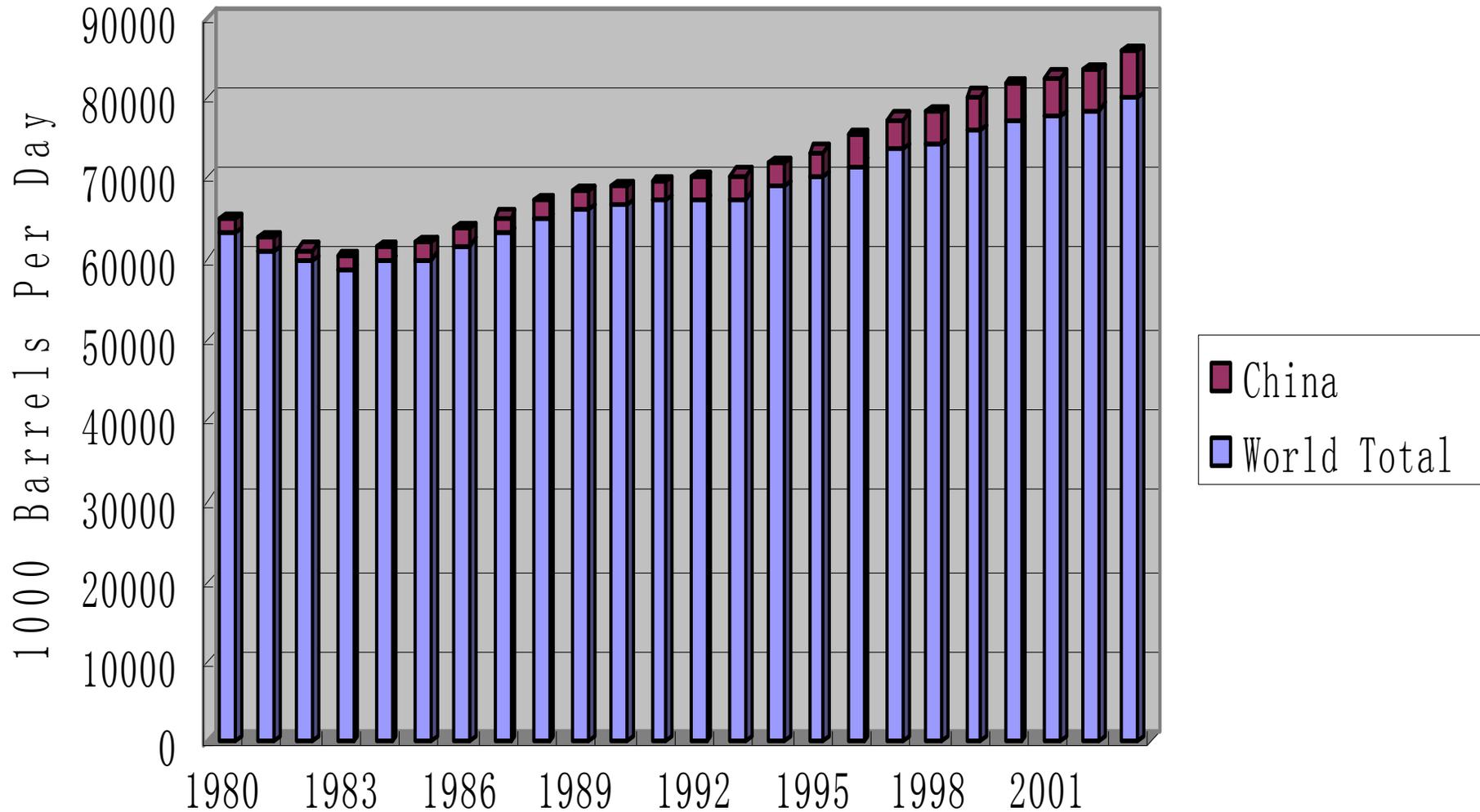


China has become the major energy consumption country in the world

- The United States, China, Russia, Japan, and Germany were the world's five largest consumers of primary energy in 2003, accounting for 49.8 percent of world energy consumption.
- Ratio of energy consumption in China has increased from 2.8% in 1980 to 6.9% in 2003 in the world consumption ratio. This ratio will be continuously increased and rapidly rising.



The Share of Chinese Energy Consumption in The World



Natural agriculture and energy agriculture

- “Natural agriculture” refers to the major reliance on natural resources, soil fertility, rain-fed irrigation and manual labor in farm produce production.
- “Energy agriculture” refers to the major reliance on mechanic force, chemical fertilizer and insecticide, etc. in farm produce production. It refers to agricultural production that mainly relies on energy source (such as petroleum) as the raw material in input and force.

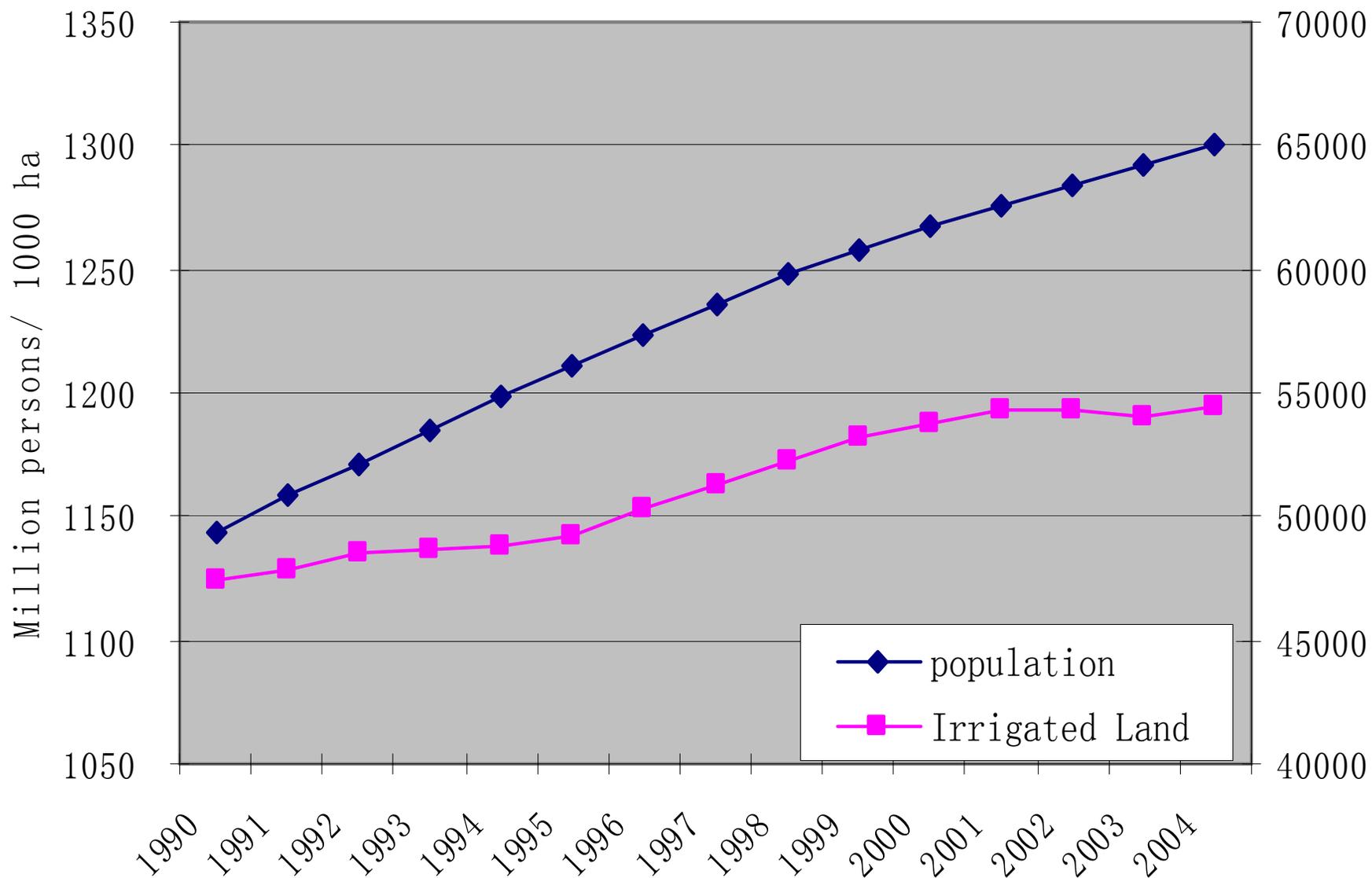


Agriculture production in China

- The agriculture in China has already become “energy agriculture”. Because, the reason that China can meet the farm produce demand of increasing increased population is mainly rely on yield increase through input large quantities of chemical fertilizer and insecticide. Due to the fact water resource is seriously short, it has relied on large quantities of electricity and diesel to pump underground water for irrigation of crops.



The Population and Irrigated Land in China



Per Capita Food Consumption of Urban Household (Unit: kg)

	1990	1995	1999	2000	2003	2004
Grain	130.7	97.0	84.9	82.3	79.5	78.2
Vegetable	138.7	116.5	114.9	114.7	118.3	122.3
Fruits	41.1	45.0	54.2	57.5	57.8	56.5
Meat	25.2	23.7	24.9	25.5	32.9	29.2
Dairy	4.6	4.6	7.9	9.9	18.6	18.8
Aquatic PRD	7.7	9.2	10.3	11.7	13.4	12.5

Chemical fertilizer, insecticide and mechanic input

- In order to increase farm produce yield to meet the increasing domestic market demand, the chemical fertilizer input volume in agricultural production has increased year by year. In 1990, the total chemical fertilizer input volume was 25.9 million t, in 2004 it had increased to 46.0 million t, an annual growth rate of 5.27%。

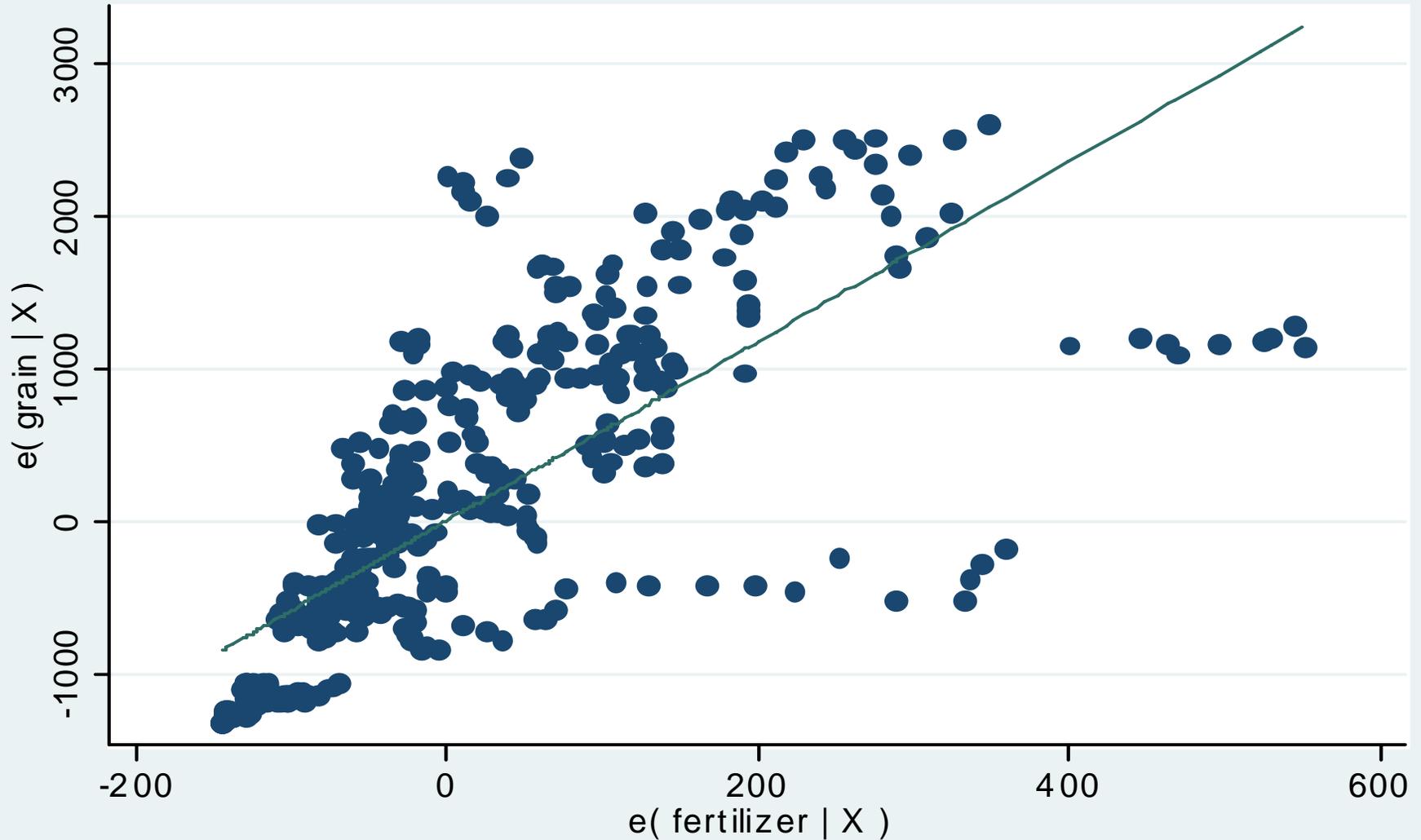


Price of tractors has decline

- The price of tractors has continuously declined, The use volume of diesel has rapidly increased.
- Another factor influencing agricultural mechanization is that rural young labors go to cities for work, and the remaining labor engaged in agricultural production is women and aged farmers.

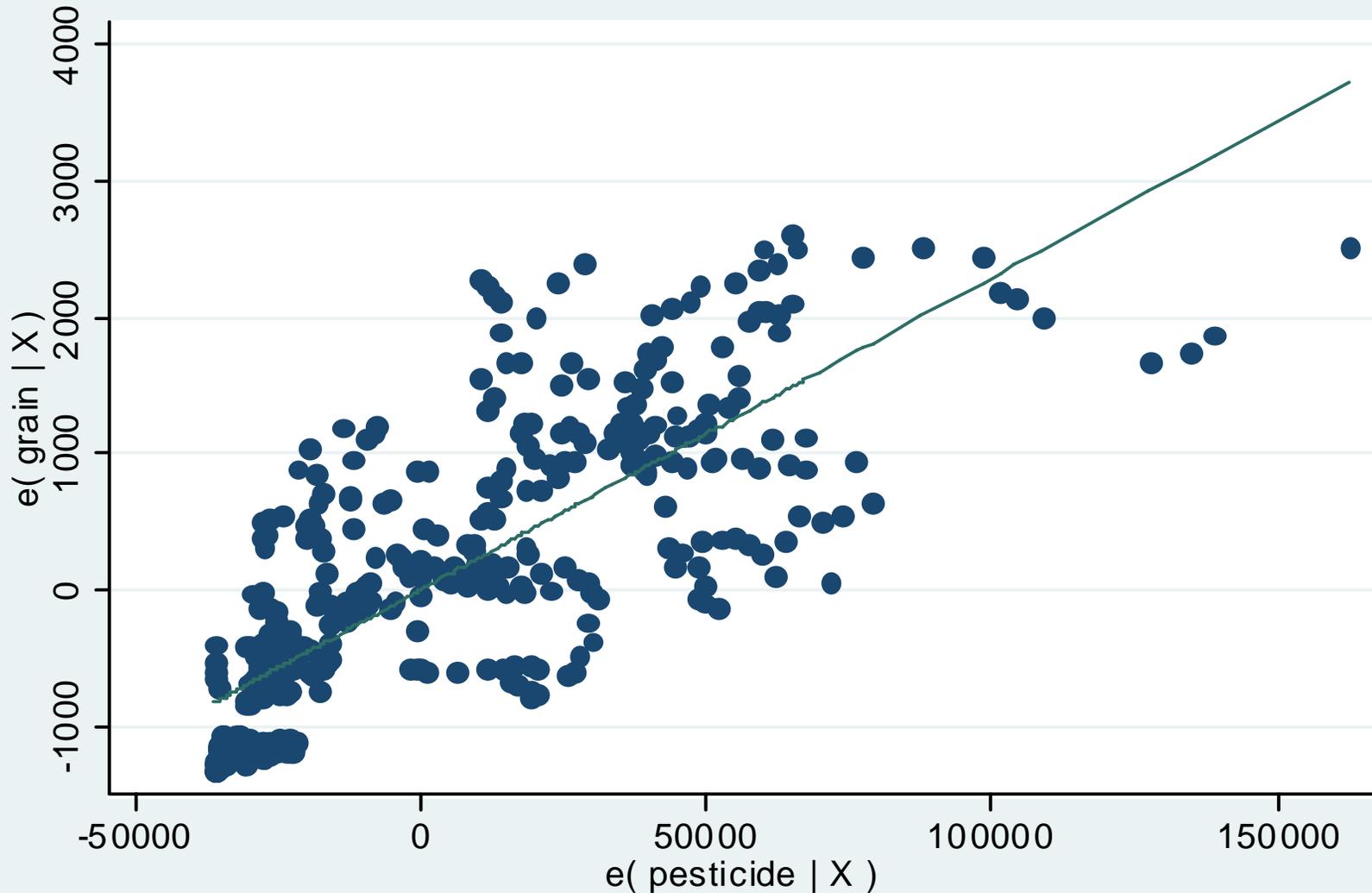


Relation between chemical fertilizer input and grain yield (regression result)



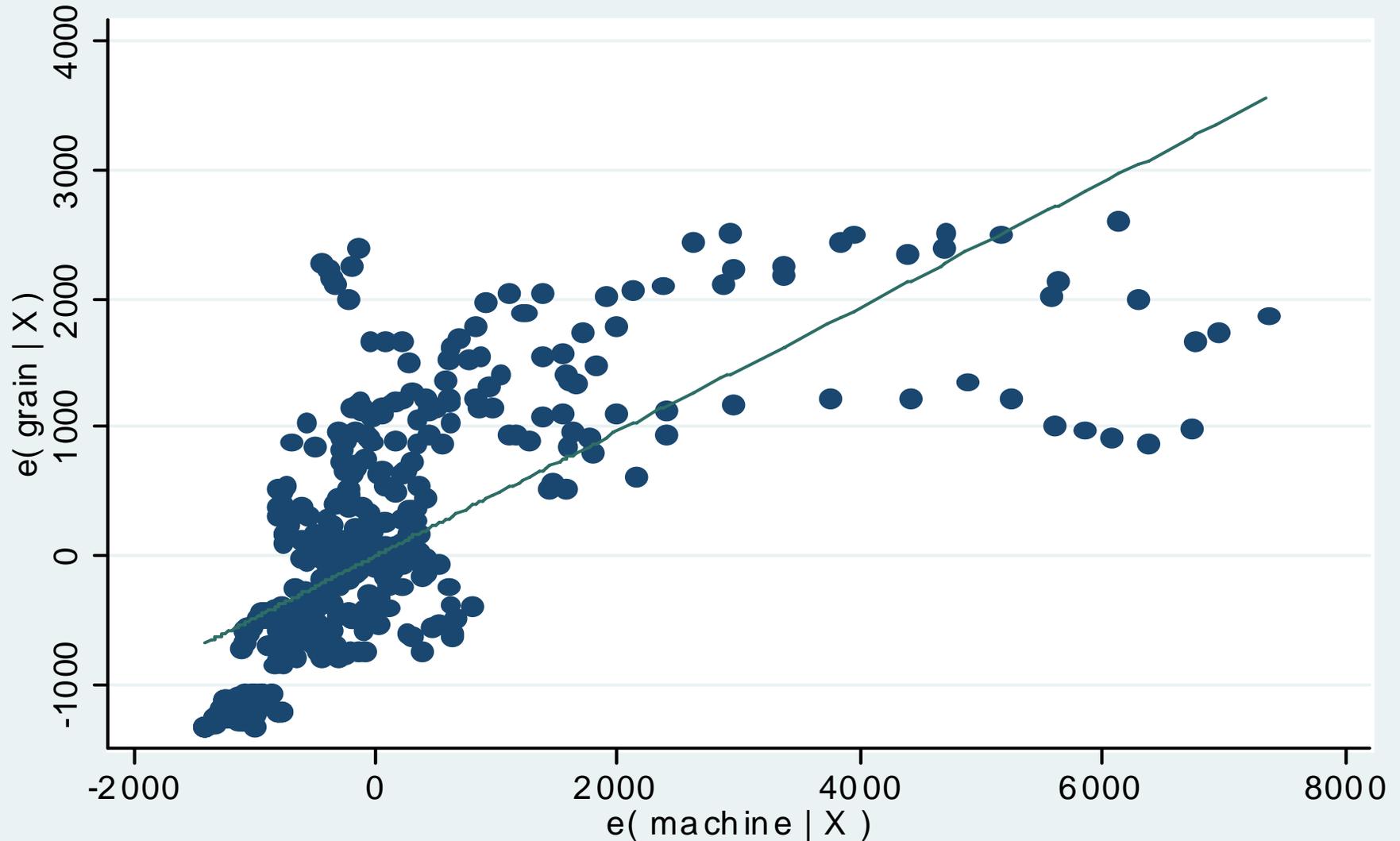
coef = 5.8949523, se = .24151855, t = 24.41

Relation between insecticide input and grain yield (regression result)



coef = .0228464, se = .00080909, t = 28.24

Relation between mechanic force input and grain yield (regression result)

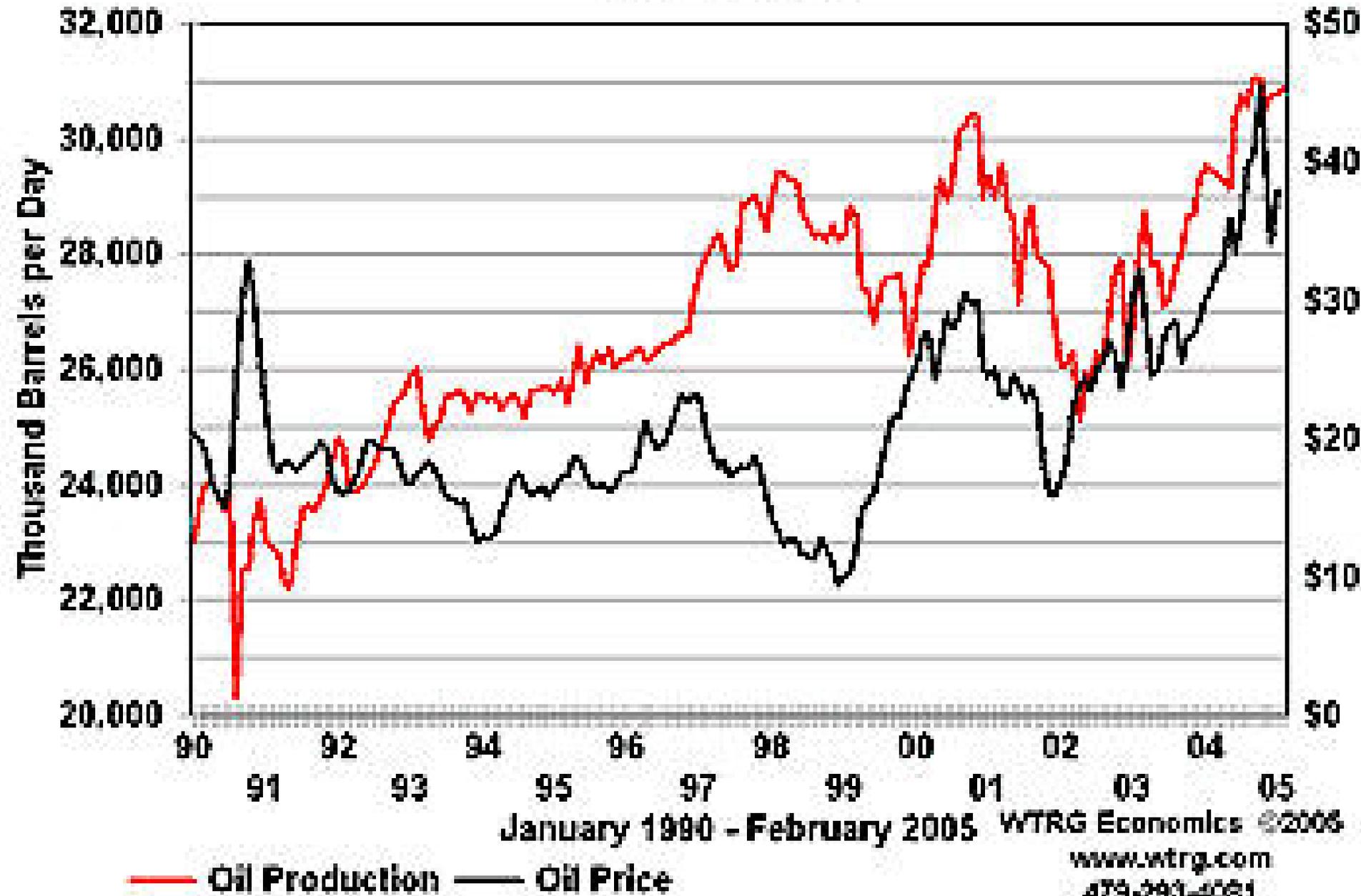


coef = .48353517, se = .02221981, t = 21.76

Effect of energy price rise on agriculture

- There are 2 aspects in the effect of energy price rise on agriculture: one is that it directly influenced farming sowing, irrigation, electricity and other production cost ; Second is the due to the price rise of chemical fertilizer, plastic film, insecticide and other agricultural means of production, thus it has indirectly influenced the increase of production cost.

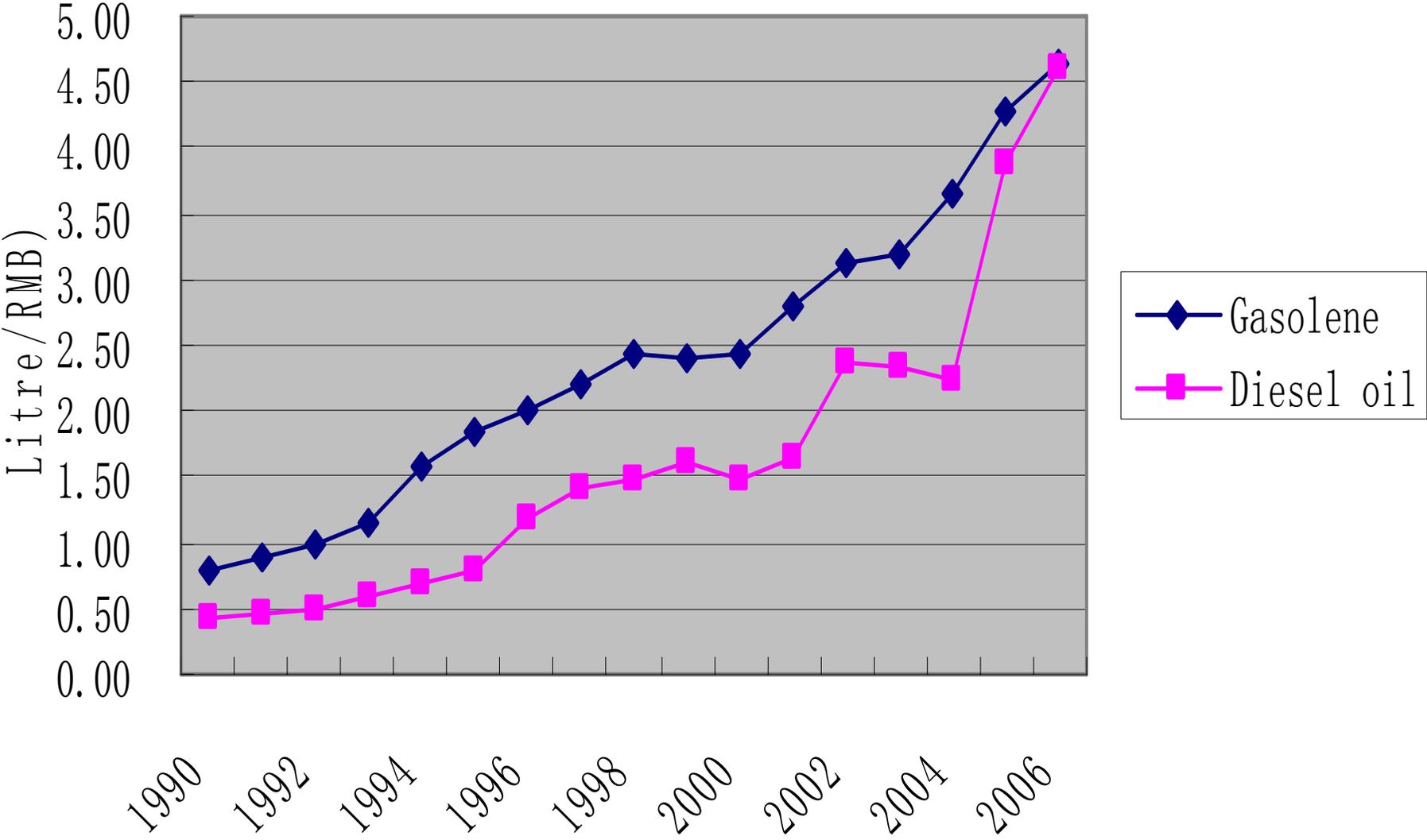
Crude Oil Production (Mbb/d) OPEC Countries



January 1990 - February 2005 WTRG Economics ©2006

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The price of Gasolene and Diesel Oil in China



The Cost of Fertilizer at Producing Major Crops (Unit: Per ha/ US\$)

	2000	2001	2002	2003	2004
rice	106.9	105.4	107.1	110.0	136.5
wheat	121.9	98.5	104.9	102.6	125.4
maize	108.5	104.1	110.2	113.2	139.9
soybeans	30.6	33.6	34.2	39.0	42.8
cotton	143.9	138.2	151.6	159.3	191.0

The Cost of Pesticide at Main Crops Production

(Unit: Per ha/ US\$)

Products	2000	2001	2002	2003	2004
rice	27.9	29.2	29.1	32.7	41.7
wheat	11.3	9.4	11.0	10.5	12.8
maize	7.7	8.1	8.8	8.7	10.5
soybeans	10.4	8.1	9.6	9.7	16.5
cotton	75.0	69.2	64.2	70.9	60.9

来源：《2005年全国农产品成本收益年鉴》

The Cost of Irrigation at Main Crops Production (Unit: Per ha/ US\$)

	2000	2001	2002	2003	2004
rice	33.7	36.0	34.6	36.0	34.4
wheat	44.0	29.7	30.5	29.2	32.6
maize	21.5	21.5	18.0	17.6	17.4
soybeans	7.6	6.8	8.6	8.1	10.8
cotton	34.7	36.3	40.5	41.5	42.0

The Cost of Plastic Film at Main Crops Production (Unit: Per ha/ US\$)

Products	2000	2001	2002	2003	2004
rice	5.19	4.88	4.82	4.33	5.72
maize	4.54	5.74	4.99	4.99	3.30
cotton	27.06	29.59	25.82	31.35	34.88

Impact of Energy Prices on Crop Production

- 1) Cost of Production Increases
- 2) Transportation Cost Increase
- 3) Competitiveness of Ag Production Decreases
- 4) Comparative Advantages of Ag Production Changes in Different Regions and Different Crops



Changes in food consumption structure

Along with the increase of consumer income, improvement of transportation conditions, it has caused changes in food consumption structure of the consumers in China.

Particularly consumers in North China. In the past the major vegetable varieties in winter were mainly Chinese cabbage, and potato, but now they have increased to several decades of different varieties.







Supermarket development

- Supermarket in China gained its rapid development in mid-1990s. At present, China has 74000 supermarket stores 2004, and this figure is still rapidly increasing.
- Supermarket has provided even more commodity varieties and comfortable shopping environment for the consumers. However, the cold chain system and lighting have consumed large quantities of energy.





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Vegetable varieties marketed in supermarkets in Beijing

Name of supermarket	Vegetable variety	Organic and green vegetable varieties	Name of supermarket	Vegetable variety	Organic and green vegetable varieties
Huarun	20	15	Huaguan	84	47
Hualian	32	17	Huaguan Shopping Center	70	33
Huapu	20	20	Taixingyuan	33	16
Hua'an	18	10	Wumart Fresh Food	77	46
Zhuangsheng	42	15	Yikelong	47	25
Auchan	87	46	Wumart (Yungang)	17	13
Huaguang	87	47	Wumart	20	9
Carrefour	92	30	Hengyuan	75	40
Chaoshifa	35	29	Wumart hypemarket	18	10
New World	68	68	Lotus (Liuli Bridge)	30	14
Jinkelong	18	0	Shuntianfu	72	30
Lotus	68	50	Huapu (Hangtian Bridge)	20	4
Mallin	67	24	Yikelong	20	15

Adoption of new vegetable production mode

In North China, restricted by natural conditions, in winter it cannot produce the majority of vegetables. Therefore, the vegetable growers establish glasshouse, and produce vegetables in winter through heating the glasshouse, increase temperature. However, glasshouse heating will consume a lot of energy.





Vegetable distribution among regions

- Another model to increase vegetable supply is long distance transportation of vegetables between regions.
- Due to the fact that China has broad land, and different temperature in different regions in different seasons, therefore, people can make use of the air temperature of different regions to guarantee all-year vegetable supply.



Migratory bird model

- Shanghai Gaorong Food Co. Ltd. is a large-scale supermarket vegetable supplier and exporter. In order to maintain a year-round stable supply of vegetable varieties for the supermarkets and export, the Gaorong Co. has established vegetable production bases in Different parts of China.



Shanghai Gaorong Vegetable Group

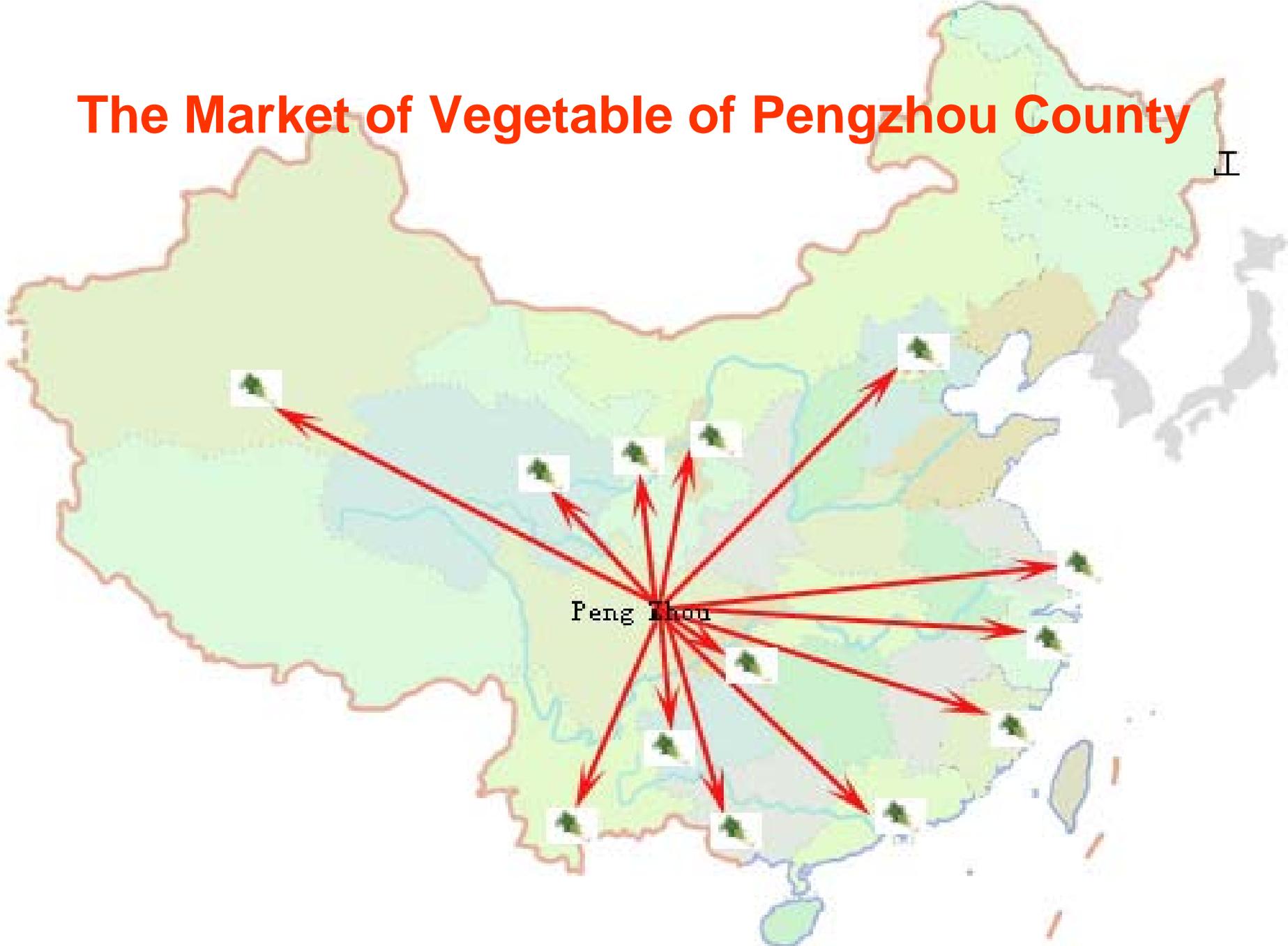


Pengzhou case in Sichuan

- Pengzhou county is a small county in Sichuan province, has very rich vegetable varieties. The major staple vegetables are 20~30 varieties. There are more than 70% of farmers in this county are producers of vegetables.
- Vegetables produced in Pengzhou rapidly enter the national vegetable distribution network. vegetables produced in Pengzhou can be marketed to nearly whole the country.



The Market of Vegetable of Pengzhou County





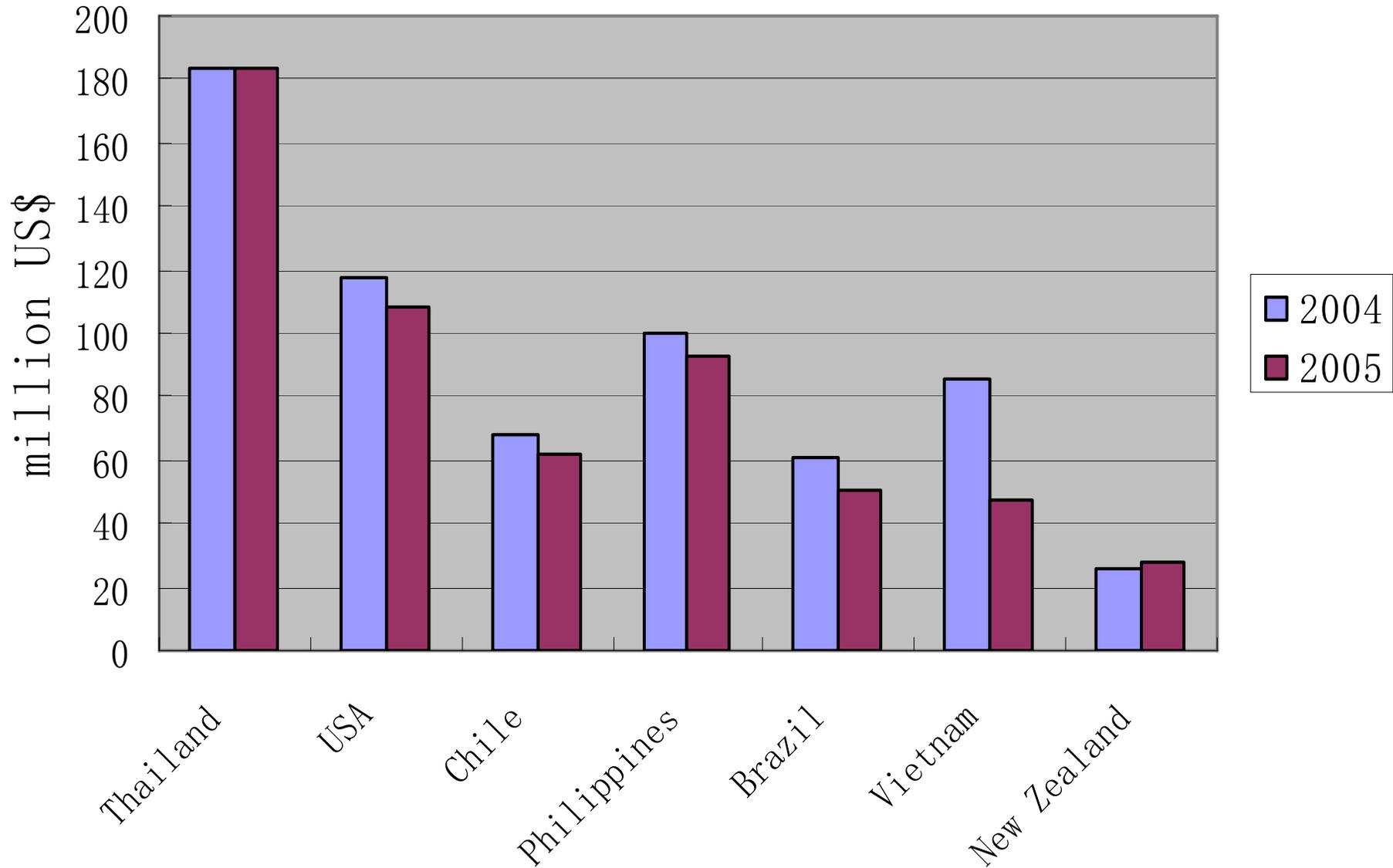


Situation of fruit import in China

Along with the joining of WTO by China, China has gradually opened the fruit market. The increase of consumer's income has increase the demand for imported fruits and the development of supermarket has provided an effective and brief distribution channel for import fruits, which has made a rapid increase of the import fruit variety and quantity in China.



Fruits Import into China







Freight increase

- In May 2006, we had made a survey in Xinfadi Wholesale Market in Beijing, and interviewed a total number of 40 wholesalers.



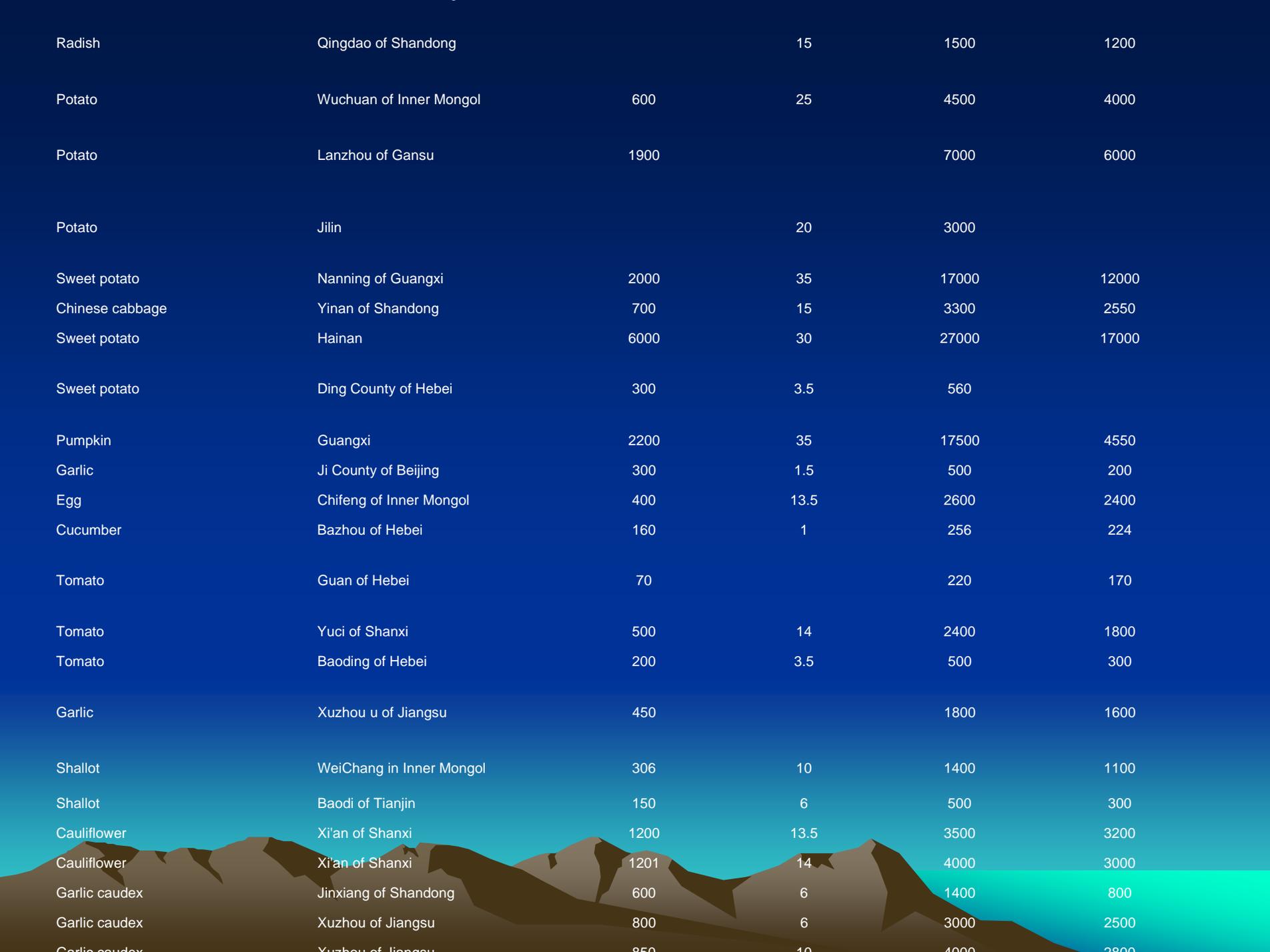
Survey in Xinfadi Wholesale Market in Beijing



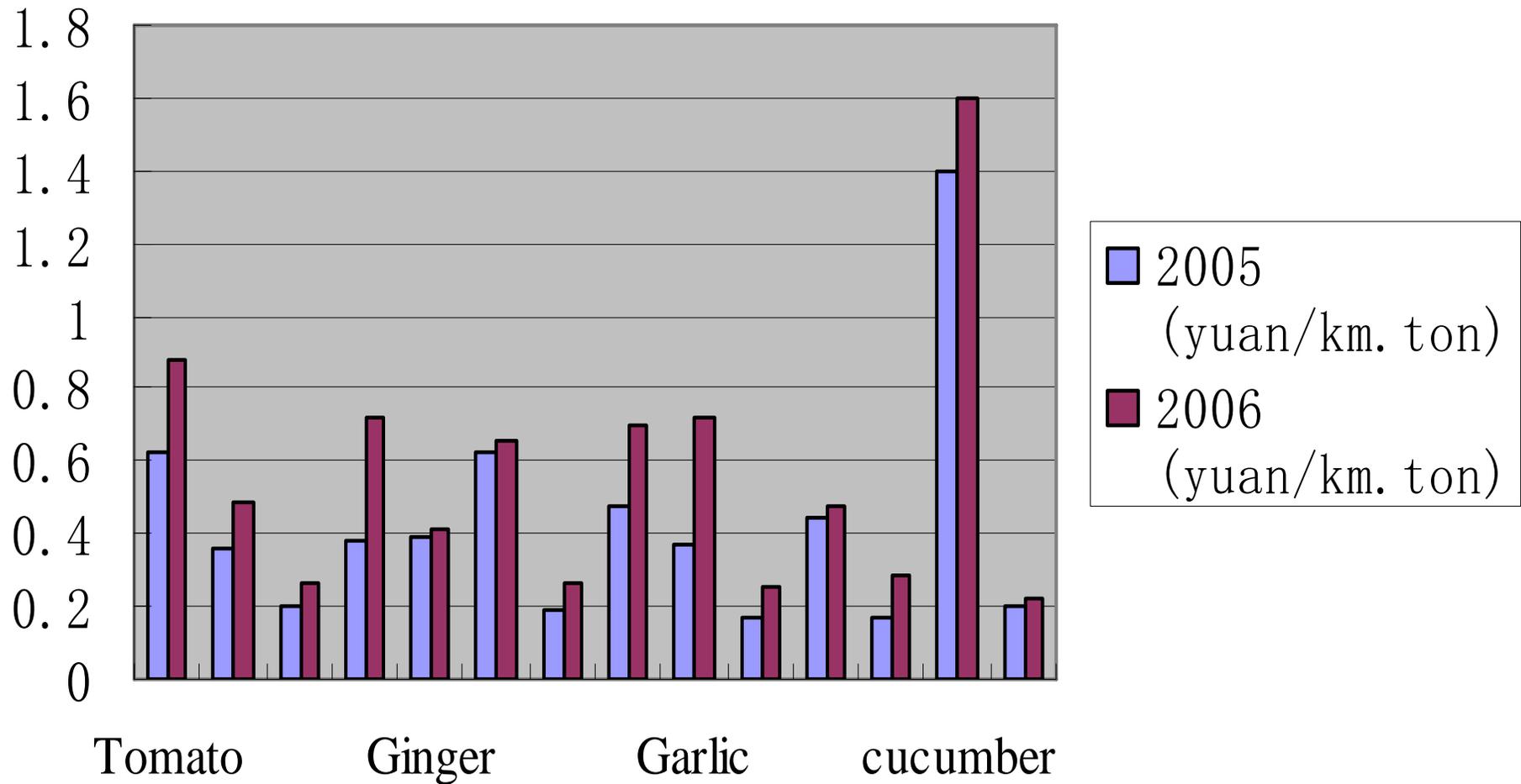


A Survey at Xinfadi Wholesale Market in Beijing

Vegetables	From	the distance between local area and Beijing (Kilometer)	Capacity of truck(Ton per truck)	Freight (Yuan per truck)	Freight one year ago(Yuan per truck)
Fresh kidney beans	Jingzhou of Liaoning	500	14	2000	
Eggplant , sponge gourd , bitter gourd , bell pepper	Shouguang of Shandong	500	3	2800	2000
Kidney bean	Guangzhou of Guandong	1900	23	10800	
Sponge gourd , eggplant	Shouguang of Shandong	500	14	1700	3000
Garlic	Zhengzhou of Henan	650	12	2600	
Water-melon , potato , shallot	Mountain of Yimeng of Shandong	700	13	3100	1400
Garlic	Zhoukou of Henan	900	10	2000	1600
Garlic	Zhoukou of Henan	900	4.5	1000	750
Garlic	Yongxing of Hebei		1.25	150	110
Garlic	Tianjin	90	2	140	130
Ginger	Yantai of Shandong	700	10	2400	
Ginger	Weifang of Shandong	600	10	2100	
Ginger	Weifang of Shandong	600	3.5	1200	1000



Changes of Transportation Cost



Effect of energy price rise on consumers

- Due to the increase of farm produce consumption by urban residents in China, especially the urban resident along the coast, and the reliance on farm produces produced in elsewhere in China and in foreign countries, the consumption quantity will be effected by energy price rise, and this factor will become even greater and greater.



Effect of RMB revaluation on petroleum

- In recent years, the exchange rate between RMB and US\$ has been increased (RMB revaluation) . Due to the fact that petroleum in China relies on import increasingly. Although petroleum price in the international market is rising, if the speed of RMB revaluation exceeds the rise of world petroleum price, this will make the same amount of RMB to purchase much more petroleum. This will encourage China to consume large quantities of petroleum in the future.



Conclusion

Along with the increase of energy demand in the world, the energy price is increasingly rise. The effect of energy rise on the agricultural sector in China is as follows:

- 1、 Energy price rise will increase farm production cost, transportation cost, and finally influencing farm rise of produce price;
- 2、 Energy price rise will influence the farm food consumption by the Chinese consumers (We also need to consider about the income increasing) ;

3、 Energy price rise, on one hand, it will reduce the international competitiveness of agricultural produces in China for export; on the other hand due to transportation cost rise, it will reduce the competition pressure of imported farm produces to certain extent.

4、 The revaluation of RMB will be possible to reduce the pressure of petroleum price rise on China.





Thank You for Listening