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An Analysis of Current Problems in China's Agriculture Development: Agriculture, Rural Areas and Farmers

Yongxin Quan, Zeng-Rung Liu

Yongxin Quan: Department of Agricultural Economics, McGill University,
Email:qyongxin9@yahoo.com;
Zeng-Rung Liu: Department of Economics, Concordia University,
E-mail: liuzr@alcor.concordia.ca

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Abstract

China is the most populous country in the world. Of its 1.3 billion people, 22% of the world population, about 67% are living in rural areas. Although China is the third largest country in terms of area, the arable land is only 7% of the global amount. With relatively meager endowment, it is undoubtedly a daunting task for the agricultural sector to provide adequate supply to fulfil huge needs for food and other agricultural products. In addition, agriculture development in China confronts with challenges to raise the average income and standard of living of the rural population in the long run.

Since China's economic reform was launched in 1978, the "People's Commune" system was dismantled and replaced by the "Household Responsibility" system. Agricultural production has achieved rapid growth and income per capita in the rural area has risen 10 times in 20 years. During this transformation process, a number of serious problems have been emerging in the agricultural sector. They include the diminishing size of the arable land, enlarging of income disparity and stagnating of productivity growth, which have been exacerbated by the population growth and increasing demands for agricultural products. The agricultural sector is also plagued by environmental degradation and confronted by township enterprise development. Furthermore, China's recent accession into the World Trade Organization (WTO) brings more tremendous challenges to its agriculture.

This paper is intended to provide a concise analysis of the problems and possible policy options associated with current agriculture development. It reveals that the main problems are market partition, inefficiency in government administration in supply and distribution, and price distortions of agricultural products, originating from China's development strategy of preferred industrialization in the industry sector and urban development.

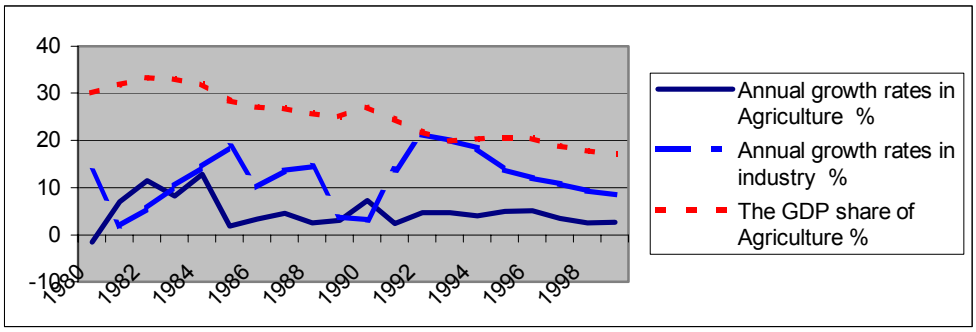
This paper also explores and assesses a few government policy options for the alleviation of these problems. Policy options focus on deepening market-oriented reforms, including price deregulation, market integration and property (land) reforms, which also reflect the requirements of the Agriculture Agreement of WTO. Policy options also focus on improvement of government supported programs in investment and subsidies aimed at boosting productivity, narrowing the inequality of income distribution and easing the barriers for mobility of surplus labor into the industry and service sectors in urban areas .

1. An Overview of China's Agriculture Development since the Economic Reform

China has the largest population, 1.3 billion, about 22% of the world and 870 million, or 2/3rd live in rural area. Although China has the world third largest area of 960 million square kilometers, the arable area is only 107 million hectare, only 7% of the global arable land.[1] Therefore, agriculture is the fundamental industry not only to guarantee the supply of food and other agricultural products for the huge population but also the source of fundamental income for rural people. The long-term objectives in China's agriculture development are to fulfil the increasing demand of food and other agricultural products, to boost rural development and to improve income and living standards of rural people, which are summarized as the development of Agriculture, Rural areas and Farmers.

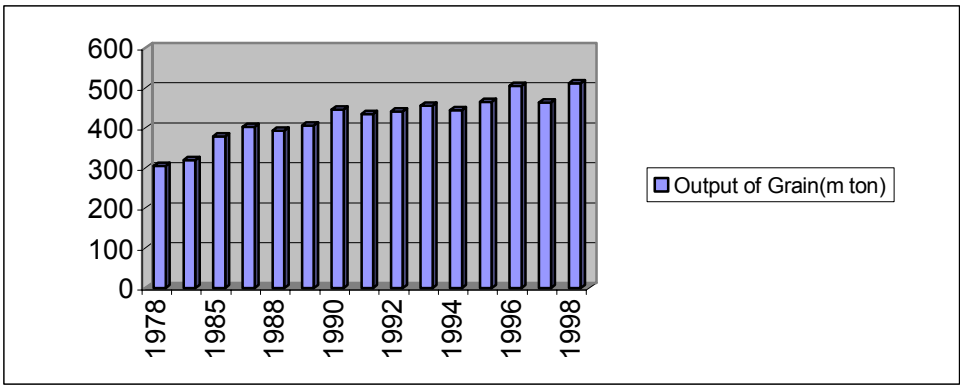
Since the market-oriented economic reform in 1978, agriculture sector has achieved rapid growth. Total value of agriculture product reached RMB 700 billion (US$85.4 billion) in 1998, 2.5 times of 1978. Figure 1.1 shows the annual growth rate of the agricultural sector reaching an annual average of 7.2% in the last 20 years. China is one of the major agricultural producers in the world, leading in production of grain and livestock and keeping the annual food consumption per capita remains at 400kg, at the international nutrition level, along with the population increase from 900 million in 1978 to 1.3 billion in 2001. [2] Figure 1.2 shows that total grain production rose significantly from 304 million tons in 1978 to 510 million tons in 1998. Compared with some developing countries with difficulty in food supply, China has successfully fulfilled domestic food demand on the basis of self-sufficient policies and regulations.

Figure1-1 The Annual Agriculture and Industry Growth Rates as well as the GDP share of the Agricultural sector: 1980-1999 (Data from EIU database-China)



In Figure 1.1, it shows declining trend of the GDP share of the agricultural sector from 30% in 1978 to 17% in 1999, which is related to the difference in growth rates between the agricultural and the industrial sectors. The average annual growth rate is 7.2% in agriculture sector, less than that of industry sector at 10% during the period (1980-1999). Figure 1.1 shows that generally the industrial sector remained faster growth than the agricultural sector, which experienced a slow down in growth, during this period. However, in the initial stage of the reform in 1980-84 and in the years of 1990-92, the agricultural sector achieved higher growth rates.

Figure 1-2 China's total output of grains 1978-1998
(Data from Xinhua News Agency, 2-29-2000)



It is not abnormal that the industrial sector grows faster than the agricultural sector because of the advantages in investment, technology and labor in the industrial sector, with the falling share of the agricultural sector in GDP during the course of industrialization. However, it is worth paying attention to the slow down of the growth in the agricultural sector from higher rates than those of the industrial sector to the sudden falls in the years after 1980-84 and 1990-92.

Rural people have benefited from the reform, improving food consumption and basic living conditions. The annual income per capita in rural area roses 10 times. However, the income increase in rural areas experienced stagnations in recent years. The booming of Township Enterprises (TEs) in the rural areas created employment opportunities and sources of income increase for rural people. At the same time, there is also a trend of widened income disparities between urban and rural people.

Rural areas also achieved significant development. The investment from governments improved systems of transportation, communication and electricity. The involvement of farm business into market strengthened connections with urban areas so that farmers can improve their income and enjoy many modern household facilities such as TVs and telephones. The Compulsory Education Act guarantees the rights of children in education. The life expectancy in China has reached 72 years over the world average of 64.[3] These are the indications of the improvement in people's living standards, including rural people. However, the rural development between eastern regions and western regions has shown an imbalance with disparities in income and growth, especially between industry-based coastal regions and agriculture-based inner areas.

In addition, many other problems emerged and accentuated in the agricultural sector along with the reform. The amount of surplus labor in rural area has reached 140 million, accounting for 40% of the total rural labor force.[4] Environmental degradation becomes severe during 1990s, many of which can be traced to agriculture practice. China experienced many natural disasters such floods and drought, suffering from GDP loss of US$9.7 billion in 1998 and covered 61m ha area.[5]

At the same time, demands for food and other agricultural products increase along the annual growth rate of population at 0.9% and GDP growth at 8% annually.[6] After China's accession into WTO in 2001, the agricultural sector will face more intensive

international competition and threats to the self-reliant agricultural policies. How to treat and solve these problems is not only crucial to agriculture development, but also important to the over all reforms. Since these problems are all associated with governmental strategy of development and policies in agriculture, institutional reforms should be carried out to address these problems.

2.Current Problems in the Agricultural Sector

Along with the economic reform since 1978, agriculture development in China has achieved success as well as problems of stagnation in growth rate and income increase as well as widened income disparity and environmental problems. These problems can be traced to market distortion, production distortion, decreased investment in agriculture, improper land policies, the development of township enterprises and the institutional constraints on the mobility of the surplus labor force in agricultural sector. These are associated with governmental interventions and threaten the prospect of agriculture development and modernization in the future.

2.1. Market distortion, decreasing investment and land property rights

Since China is a traditional central-planning country, market-oriented reforms often encounter market distortion related to the governmental interventions. Market distortion is embodied in the production inputs and the product distribution side. On the production input side, land, labor force and capital are not efficiently allocated due to current institutions while on the product side, although governments have freed markets for many varieties of products such as vegetables and fruits, the main bulk products such as rice, wheat, cotton and corn are still under control. According to an report of International Monetary Foundation (IMF), until 1992, marketable products increased to 70% of all varieties. These inefficient policies lead to market partition, production distortions and price distortions.

The fundamental objective of the central government is to ensure the food supply. With decreasing arable lands for increasing population, one of the priorities in agriculture policies is to guarantee the area of arable lands in different regions for the production of bulk products. Governments allocate certain amount of arable lands and set quotas of output to farmers in order to ensure the production of bulk products. Farmers are basically limited to living in rural areas by the current policy of labor mobility. Therefore, farmers have to depend on the lands for a living and only sell their products in the market after selling certain amount output on a quota basis or in contracts with governmental agencies. This policy jeopardized the use of land for other cash crops for higher profits based on comparative advantages and led to production inefficiency. In addition, since the quota prices were lower compared with market ones until 1992, farmers had become worse-off from these price distortions from this system. It is estimated that this price distortion reaches RMB93.8 billion (US$11.4 billion).[7] Governments control the purchase and distribution of bulk products through state-owned storage and distribution companies. This mechanism limits the market connections among different regions, causing market partitions.

At the same time, another important production input--capital is limited to the agricultural sector. The natural risks, low profitability in agricultural production as well as the price distortion and taxes causes less business investment into agriculture. In addition, the government has reduced investments in agriculture. The governmental support rate in agriculture dropped from 10% of the total agricultural product in 1980 to less than 4% in 1992. For example, the total investment in 1986 was about RMB3.5 billion (US$43million), without discounted calculations, even much less than RMB 4.9 billion (US$59million) in 1980. [8] Farmers also endure heavy taxes and duties, which reduce sources of investment. For examples, agriculture taxes amounted to RMB10.9 billion (US$1.3 billion) in the period 1979-1999. [9]Furthermore, data from China Statistics Bureau shows that the out- flow capital from agriculture to industry is getting large through deposit and investment in the industrial sector. In 1994, this figure reached RMB 12.9 billion (US$ 1.6billion), exceeding the governmental capital transferred to agriculture, RMB 7.5 billion (US$91million).

These distortions form the base of a dualism in the national economy and jeopardize the development of agriculture. The dualism can be traced to the China development strategies in the last decades. China has followed the former Soviet Union to implemented development strategies of heavy industrialization since 1950s, focusing on the development of the industrial sector and rural areas. With capital scarcity relative to labor resource, the government implemented this price system in agriculture, allowing capital transfer to subsidize the industrial sector while keeping income of urban people at a fairly low level with principles of low income, low consumption and high accumulation.

The functions of price and market mechanism as well as well-defined land property rights are significant for agricultural growth. We can see in Figure 1.1 that the growth rates in agriculture sector in 1980-1984 and in 1988-1992 are significantly higher than the other years, even reaching 10% annually. This can be explained by the changes of agriculture policies. In 1980-1984, the initiation of land use policy admitted the allocation the collective land to farmers, which made the new household production take instead of the former collective ”People’s Commune”. Many agricultural products were allowed to traded in the free market, greatly activating farmers’ incentive to optimize their profits through market. At the same time, in the government- controlled products, the average prices were raised about 20%, which also directly contributed to the increase of grain and cotton output. Income of rural people also experienced rapid growth (Figure 2-1). However, along with the price control in 1985 for high inflation, the growth rate decreased sharply from 12% to 1.7% immediately.

In 1988-1992, along with the deepening reform in the city and industry, the urban citizens’ income increases much (Figure 2-1) and the government raised the food purchase price about 20-30% to boost the agriculture development again. But with the coming high inflation in 1993, governments resumed strict price control under governmental purchase and distribution systems till present, causing the slow down of the growth rates again.[10]

At the same time, with the uncertainty for long-term use of lands, farmers have little interests in making investment in production in the long run, especially in the collective infrastructures such as dams, ditches, and other infrastructure. The uncertainty on the use

of land also leads farmers to abuse the land with concentration of crops without proper cultivation and recovery, leading to soil erosion and water run-off.

2.2. Widened income inequality, poverty and restrictions of labor mobility

Farmers' annual net income per capita has increased in the last 20 years, rising from RMB 200(US$24.4) in 1978 to RMB 2253(US$274.8) in 2000 (China Statistics Bureau, 2001). However, due to the lower growth in agriculture than in the industrial sector, the income disparity between urban and rural people has been enlarged. This is an indicator of dual economy associated with the industry-preferred development strategy. From Figure 2-1, we can find this income disparity increases from RMB200 per capital in 1978 to RMB 400 in 1993. A recent report shows that Gini Coefficient has reached 0.458, exceeding the warning level of the international inequality . The richest 20% population occupy 42% of the total income and the poorest 20% population account for only 10% of the total income.[11] According to current urban and rural economic situations and 2/3 population in rural areas, these data imply that the income inequality between urban and rural people becomes worsen.

As we analyzed in the preceding, distortions related to governmental interventions are essential factors affecting income increase of farmers. These distortions especially affects the farmers in inner areas of grain production and enlarges the income disparity between these areas and the eastern areas, which benefit from the development of TEs and foreign direct investment(FDI) . Cater (1999) showed that in the early 1990s, government removed food subsidies to urban citizens and took measures to balance the purchasing price of agriculture products according to market prices. The price adjustment was supposed to benefit farmers. However, because of the increasing costs in production, especially the input prices of chemical fertilizer, seeds and pesticides as well as rising fees and duties, farmers' net income growth experienced stagnation. Data from State Statistics Bureau show that the average revenue of grain output for 1 mu(0.07 ha) is RMB315 , almost the same amount as the sum of costs and taxes and duties, leaving razor-thin profit margins for farmers. It is estimated that the taxes and fees for farmers amount to RMB 120billion(US$ 14.6billion), over 16% of total agriculture product in 2000, among which, governmental taxes only account for 25%, leaving 75% as the rest duties and fees from local county or village bureaus. [13]

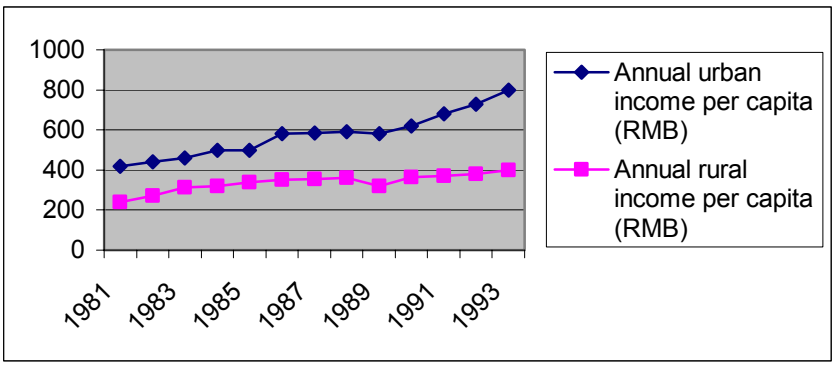
On the production cost side, the high costs are also related to household production and surplus of labor in the production, without reaching economy of scale and even with negative marginal product of labor. It is estimated that in the total 350 million rural labor force, there are surplus about 140 million. [14]

Anderson (1987) demonstrated that alongside the industrialized development, because the income elasticity of food products is less than one while the income elasticity of industrial products is over one, the agriculture share to GDP and labor in agriculture will decrease to create labor surplus. In addition, according to Lewis development model, with wage differences between the industrial and the agricultural sector, surplus labor in agriculture will migrate to the industrial sector if the labor market is free. The transfer will increase the income of the transferred labor as well as farmers' income eventually, for the production possibility with economy of scales. In this meaning, labor mobility

from the agricultural sector helps to reduce income disparity between urban and rural areas.[15]

This has happened since the reform. The coastal and southeast area have boosted their economy with the development of TEs and FDI in manufacturing sectors. Local labor force from agriculture migrated to TEs and joint ventures. With the increasing urban income and demands, farmers expand the production of higher value-added farming of vegetables, fruits and livestock instead of grains. Rural people in these regions increased income much faster than those in the inner regions. Until 1994, Agriculture labor force in these areas had decreased to 48% in the total labor in the east area while inner area kept at 68% in the total labor. GDP per capita in east area reaches RMB 2865 , 74% more than that in the inner and west area in 1992 (China Statistics Bureau, 1994).

Figure 2-1. The comparison of urban and rural annual income per capita 1981-1993



(Data from China Statistics Yearbook 1994)

Why is income disparity enlarged between urban and rural areas and between different regions? And why is there still so large surplus of labor in agriculture sector? It can be traced to fundamental policies of labor mobility in China. There are institutional restrictions on labor mobility from rural to urban areas.

Governments classified people according to the status of residence and careers, basically into rural and urban citizens. Rural people can not benefit from urban welfare in food supply subsidies, housing, education and medical care. This is due to the industrialization-favored strategy, which limits the transfer of the rural labor surplus into industry. 67% of population and 50% of labor force living in rural area are a very high number compared with the world average of 49% and 23%, respectively, even much higher than the average of low middle income countries of 46% and 45%, respectively.[16]

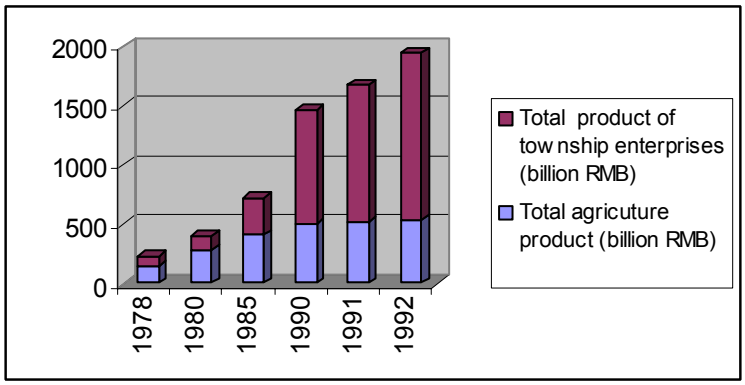
Therefore, rural people have to stick to their lands for a living. However, the average arable land is only about 0.08 hectare per capita, only 30% of the global average. With price distortion and rising costs in production, farmers have difficulty to increase income. These problems cause a dualistic economy with stagnation in farmer's income increase and income disparity between urban and rural areas. Until 2000, the poverty rate in China is 10% and most of them are from rural area, especially in the inner and western areas. [17]

2.3. Township enterprises

Township enterprises (TEs), or rural enterprises, have experienced rapid growth since the economic reform. It is one of the major achievements in the agriculture reform.

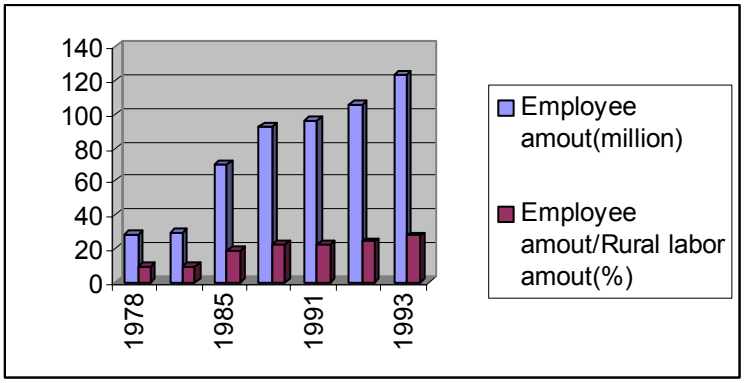
The output of TEs boosted from RMB 94.8billion(US$11.6billion) in 1978 to RMB 1410 billion(US$171.9billion) in 1992 at the average grow rate 21% , accounting for 25% of total industrial product and greatly exceeded the product of the agriculture sector, RMB 538 billion(US$65.6billion) in 1992(Figure 2-2)(China Statistics Bureau, 1993.) .

Figure 2-2 Annual total product of township enterprises VS total agriculture product (1978-1992)
(Data from EIU database-country-China and China Statistics Bureau 1993 **)**



The development of TEs is associated with China' s rural development strategy and labor policy to keep rural labor of surplus who leave land to stay at countryside. Under current dualistic situation, governments can not afford to provide much investment in agriculture and expect to subsidize agriculture through the development township enterprises. In fact, this policy have achieved success since township enterprises provided aids both in capital and technology into agriculture sector. In addition, TEs also provide effective sources to absorb local labor of surplus and increase rural income. Through business operations, TEs plays an important role in connection between urban and rural areas and contribute to the integration of urban and rural economy as well as local urbanization. Figure2-3 shows the increasing employment at TEs had reached 120 million until 1993, which accounts for 28% of the total rural labor force.

Figure 2-3 Township employee amount VS Employee amount/Rural labor Percentages
(Data from China Agriculture Bank1992,1993 **)**



However, the development of TEs also reveals some problems. TEs compete with farmers in resources such as lands and utilities, e.g. water and electricity. TEs are also criticized for causing decrease of productivity and inequality within the rural area despite its contribution to reduce the income gap between rural and urban people. Local TEs often absorb young and skilled farmers with higher income than farming, leaving the old and women farming at home, which may lead to decrease of productivity and income.

TEs developed with high growth rates in early 1980s which featured shortage as sellers' markets under the central-planning administration and the growth has slowed dramatically in the 1990s with and maturity of the market mechanism and the formation of buyers' markets. It is because many TEs are small-sized and not well planned to adapt the competition with state-owned enterprises in prices and quality. The shortages of capital, innovations and marketing capacities will make TEs face new challenges with foreign companies after the accession into WTO.

In addition, with capital accumulation over time, TEs become more capital-intensive. The capital –labor ratio had increased from RMB1100 per worker in 1984 to RMB 4800 per worker in 1993 while labor-capital elasticity decreased from 0.94 in 1979 to 0.75 in 1993[18]. These trends show that TEs' potential capacity to absorb surplus labor from agriculture is weakening.

2.4.Environmental problems

The natural disasters happening frequently on large scales and broad scopes remind us about the environmental degradation in recent years in China. In 1994 and 1998, two severe floods in the Yangtze River area caused great losses in the agriculture and total economy. In the north, for continuous years, droughts have threatened agriculture and the main water source. The second longest Yellow River without water in most of the years aroused much attention. China is seeking to solve this problem by conveying water from the south to the north. One seventh farming areas in China suffer from soil erosion. Sand winds often invade the Capital Beijing and the north area in recent years. [19]It is reported during a sandstorm in Beijing, 30,000 tons of sand fell to the ground.[20]

Many of these disasters are directly related to agricultural activities. The abuse of lands and loss of forests and water reservation as well as the deterioration of infrastructure leads to soil erosion and run-off in the middle and upper reaches of the main rivers. These degradations can be traced to current agricultural policies, in which property rights are not well defined. The uncertainty of the contract time for the land makes farmers abuse lands without sound practices of rotation and restoration. The same thing happened to the farmers contracting hilly areas and grassland, causing over-chopping and over-grazing. The abuse of land causes erosion and infertile and loses the value of long-term use. When farmers try to maximize output by over-use of chemical fertilizer and pesticides and continuous farming without proper cultivation, degradation of land also leads to the decreasing of marginal product, leading to a serious cycle of abusing and degradation of land.

At the same time, since infrastructure such as dams and irrigation system is under collective management, farmer are careless about public infrastructures and have less incentives to make investment or maintaining. In addition, less governmental investment and decreasing of rural income worsen the situation.

Another important source to environment pollution is from township enterprises. Their production often depends on local natural resources. Excessive exploration, lack of regulation and supervision, pollution in the way of emission of polluted air, draining of polluted water and waste can destroy rural areas severely. One major reason for the lack of environmental control on TEs is that the local government regards these enterprises as important sources of local revenue and employment. However, the natural disasters remind us the environment cost is huge. The big flood in the south in 1998 caused economic lost of RMB 80billion(US$10 billion).[21]

2.5.The challenges of the accession to WTO

Facing globalization and increasing dependence on international trade (The amount of export and import has reached US$500 billion in 2001, with trade-GDP-ratio of 45% .[22]), the central government pushed forward to access to the World Trade Organization (WTO), aiming at boosting economic growth, updating of the economic structure as well as increasing international competitiveness. Although it is estimated that the accession to WTO may contribute to 0.7-1% of the annual economic grow rate [23], China is facing much pressure in domestic industries after the accession. One of the biggest challenges happens to the agriculture sector. The basis of self-sufficient agriculture policy will be fundamental threatened. The prices and quality of agriculture products are hard to compete with those of the imported products.

Historically speaking, China did not rely much on the international market for the success of self-sufficient agriculture to balance the demand and supply in domestic market. Net imported grain shares decreases when compared with the total domestic grain production: 3.2% for the period 1978-1984, 1.2% for 1985- 1990 and 0.4% for 1991-1998 of the total production. China has even become a net exporter of grain in 1997 and 1998. [24]

China imported mainly wheat and soybean and exported mainly corn and rice. In China's agricultural imports of US$ 16 billion in 2001, 71% of which were primary products. [25]Although prices of domestic agriculture products are 20-50% higher than those on international markets, China has successfully maintained limited amount of imports through import tariff quota and license systems as well as an "trading rights " system through state import-export companies. The accession to WTO in 2001 will create significant impacts on agriculture in market accesses, export subsidies and domestic supports with the implementation of China's Agreement to access to WTO(2002) and Agriculture Agreement of General Agreement on Trade and Tariffs(GATT).

According to China's Agreement to access to WTO(2002), China will open domestic market and reduce the tariff rates on agricultural products from 22% to 17% with reduction of major products from 31.5% to 14.5%, including soybeans, meats, fruits, wine and dairy products (some detailed data are in Table 1-1). For the bulk products like wheat, corn, rice, soybean oil and cotton, China will establish a Tariff Rate Quotas (TRQs) (details in Table 1-2) system which provides a certain amount of limit for import under very low tariff rates and under high tariff rates on the amount above the quotas. Since TRQs require significant amounts under low tariffs, imports of these products are expected to have effects on domestic bulk product market. The implementation of TRQs will also be applied to trade enterprises other than state-owned companies with the

elimination of the restrictions on trading rights for most products and partial exemption for wheat, corn and rice in 3 years. This change in import and export will threaten the operation of agriculture trade and distribution mechanism towards self-sufficiency, alongside the permission that foreign companies can enter distribution systems, which is also controlled by state-owned companies at present.

Domestic supports in China will be limited to 8.5% of total agriculture product, which is lower than the level for developing countries,10%. The elimination of export subsidies of corn, rice and cotton and the cuts for other products also may reduce the competitiveness for agriculture products with high costs.[26]

Table 1-1 Tariff changes in some agricultural products after WTO accession

Product	Current level(%)	2004 (%)
Soybeans	(not available)	3
Beef	45	12
Pork	20	12
Poultry	20	10

(Source: USTR, http://cnie.org/NLE/CRSreports/international/inter-3.cfm)

Table 1-2 TRQs of some products

Product	Year	TRQ (Millon tons)	TRQ Tariff Rate (%)	Over-quota Tariff Rate (%)
Wheat	2000	7.3	1	77
	2004	9.6	1	65
Corn	2000	4.5	1	77
	2004	7.2	1	65
Rice	2000	2.6	1	77
	2004	5.3	1	65
Soybean Oil	2000	1.7	9	74
	2004	3.3		9
Cotton	2000	0.74	4	69
	2004	0.89	4	40

(Source: USDA, http://cnie.org/NLE/CRSreports/international/inter-3.cfm)

Johnson (2000) Pointed out that China's agriculture commitments on tariffs, export subsidies and domestic supports are even more open than US and European Union after joining WTO. However, the imported products with low prices will take away part of the market shares from domestic supply, leading to the excessive quantity of grain in storage. These phenomena have happened in some production regions of bulk products, such as in some Northeast regions. Furthermore, price decline with the advent of cheap imports can decrease the income of farmers and threaten their existence in the market, which means they may lose their jobs as farmers. It is estimated that there will be 20 million farmers become unemployed after the entry into WTO.[27] As we know, the current labor mobility policies jeopardize the transfer of rural surplus labor to industry and urban areas. The effect on rural unemployment after entry into WTO will have severe effects on employment and social stability.

At the same time, domestic products also suffer from inferior quality to the imported products. It is reported not only nutrition contents of wheat, rice, cotton and soybeans are lower than imports, the capacity of processing, storage and transportation are also limited for competition. National quality standards are even lower than international level. Only 40% of national standards can meet the international ones. There is no national food grading, inspection and labeling systems, which comply with international standards[28]

Furthermore, Morton (2001) pointed out that when tariffs and quotas become the main target of multilateral trade negotiations, western countries have begun to develop stricter environmental and processing regulations as new trade barriers to address the environmental and food safety concerns from consumers and to protect domestic producers. For examples, Schulman, Marin and Kelman (2000) revealed that in agriculture, environmental management systems (EMSs), based on ISO 14000 certification in production and distribution are getting popular, which need considerable capital and technology inputs, even for western farmers. The Standard Container regulations on imported agricultural products in Canada is another case of technique protections for domestic producers (Lectures from Brown, 2002).

On the demand side, as the domestic demand and food structure changes with income increase, China will have greater demand for grain and livestock products. We can find these trends from the data of China Statistics Bureau : The aquatic product rises 300% and the livestock product doubles while the grain product increases 55% from 1978-1994.

U.S. experts estimate that US can benefit from exports increase of agriculture products to China up to $2billion annually.[29] It is because US have comparative advantages in land-intensive products with lower prices based on the economy of scale and advanced production technologies. American farmers expect significant increase in export to China of wheat, corn, soybean, cotton, beef, hog as well as oilseeds and fruits after the implementation of lowered tariff and TRQs. It is reported that the annual import of soybean from US to China has reached 15 million tons in 2001, almost equal to the domestic annual output.[30]

In a word, governments are facing much pressure to coordinate national agriculture objectives of self-sufficiency with the challenges to open market and facing international competition after WTO accession. To comply with WTO rules, China has much to do in the institutional and policy transformation, which will have significant effects on agriculture development in the future.

3. Policy options of China's Agriculture Development

3.1. Deepening market-oriented reforms and reducing governmental interventions

We can find from the analysis that the policies of the control of the use of arable land and government purchasing affect domestic market for agriculture products with distorted price signals, leading to market partition and inefficient production and operation. The uncertainty in the policy of land contracting is the fundamental problem for agricultural growth in the long run at micro level. The rigid labor immobility policy

limits the transfer of rural surplus labor to industry. Stagnation in the income increase as well as the enlargement of income inequality are also related to these policy distortions. The monopoly of state-owned companies (SOCs) and agencies (e.g. National Supply and Marketing Co-operative) control the supply of chemical fertilizer, pesticides and seeds as well as the distribution and trade of bulk products, such as China Grain and Oil Import-Export Corporation. The increasing taxes and local duties alongside the expansion of rural administration reduce farmers' meager net income greatly. The coming competition after the entry into WTO will open more of the domestic market and lead to less subsidies and support in agriculture as well as pressure on institutional transformation. Therefore, there are much to do to adjust current policies to adapt and boost agriculture development.

As shown in 1980-1984 and 1988-1992 periods, price reforms towards market price led to rapid growth and improvement of farmers' income. On the contrary, in the rest time during the reform time, with price control through government purchasing, the growth of output decreased significantly directly related to the lower prices. This price distortion in addition to the monopoly in the distribution and supply, along with the reform and income increase since 1980s in the cities, made income inequality get widened gradually (Figure2-1).

It demonstrated market operation with the proper price mechanism rather than governmental administration is effective and efficient in the transmitting of market information and resource allocation. The distorted price policy in agriculture is based on industry-preferred development strategy with subsidization to the industry and urban people. As the rapid capital-intensive development in industry with capital accumulation over time and income increase of urban people, governments raised purchasing prices according to the market after 1994. This is an improvement on the effect of price distortion in agriculture products. However, governments still require farmers to cultivate designated amount of arable land for certain bulk products such as corn, rice and cotton, which leads to over- supply and price falls. Although governments guarantee to purchase from farmers, the decline of the prices can not increase farmers' income. On the other hand, over-supply also makes governments have difficulties in storage, distribution and processing the purchased bulk products.

The policies on the control of arable land for bulk products limit the regions with comparative advantages on labor-intensive products. The government purchase system combined with the monopoly in the distribution of bulk products also contributes to market partition and inefficiency of distribution. After the accession to WTO, the government has promised to eliminate the monopoly of SOCs and liberalize distribution for all agriculture products.[31] In addition, the competitive import of bulk products and the rising costs in storage and processing of excessive supply will also threaten the domestic market put pressure to reduce the policies of arable land use. Instead, the government has started to focuse on comparative advantages in agriculture. In the annual government report to the Parliament, Premier Zhu identified the objectives in agriculture are to update product structure towards more value-added and higher productivity and profitable directions and to increase farmers' income. He also affirmed that different regions should make full use their advantages, such as value-added production in the eastern regions, intensive production in the inner regions and localized production in western regions.[32]

Maler(1997) pointed out that the income elasticity to the demand of environmental amenities for poor people is less than one so that environmental resources and surrounding are necessities to farmers. However, under proper land tenure and market direction, farmers can combine environment amenities into use of land to maximum its net present value and realize sustainability in the long run .[33]

Generally, the duration of these contracts is about 5-10 years. The short term causes abuse of land , less investment from farmers as well as environmental problems.
Since land is not only the income source for farmers, but also source of social welfare (Farmers depend on income from land to support their medical care and retirement) and agriculture is directly associated with local environment, the property right for farmers to rent and use land under a long term should be protected to benefit themselves as well as social welfare and environment. The recent development of Land Contract Act to give farmers rights to rent the land up to 30 years is necessary and important.[34]

3.2. Investment, supports and increasing farmers' income

Agriculture growth depends on investment and farmers' income increase. Social stability also relies on equality based on the reduction of income disparities between rural and urban areas. As we shows ahead, insufficient investment is an important problem for the slow down of agriculture growth. Although current domestic support on agriculture only at the level of 2% of total agriculture product, after WTO accession, China can reach up to 8.5%.[35] According to Agriculture Agreement of WTO, export subsidies, direct price and income supports are forbidden. However, there is much room for governments to support agriculture according to Green Box rules of Agriculture Agreement of GATT, in infrastructure, technical supports, poverty relief and education, which are necessary for farmers. Infrastructure and technical supports can improve productivity, reduce environmental damages as well as increase the access to the market so that farmers can have better chances to increase their income. In the annual government report in 2002, Premier Zhu also affirmed the governmental input on infrastructure in rural communication, electricity and other utilities as well as irrigation systems. There are much China can learn from what US and Canada have done to support farmers to establish systematic programs without causing trade distortions, such as insurance programs, income stabilization programs and land conservation programs, complying with requirements of GATT. For instance, US government has successfully increased annual subsidies to agriculture to US$20billion annually (Schmitz and Gray, 2002).

The enforcement of regulations on land use will protect farmers' property rights so that they can have incentives to make more investment in the production. According to the problems of the access to capital for farmers, China has established government bank (Agriculture Development Bank) and consolidated financial co-operatives dealing with agriculture projects specially, e.g. China Agriculture Development Bank and Rural Credit Co-operatives since the commercialized financial reform in 1994.

Heavy tax and fee burdens on rural people should be removed, much of which are for the expenses of rural bureaus. Governments have emphasized reforms since 2001, aiming to reduce the total burden from RMB120billion to RMB50billion.Governments try to cut all the duties and fees for farmers except agriculture taxes and implement l reforms to rural bureaucracy.[36]

Japan and Korea's e experience shows that education and advance of technology can benefit economic growth not only by directly boosting the economy growth with high quality labor, but also by improving income equality and indirectly encourage the growth.[37] Governments have initiated poverty relief and technology aid programs to educate and help farmers in their practice . In the Tenth 5-year plan outline(2001-2005), rural education is ranked one of the important programs in rural development.

3.3. Prospective strategies of Agriculture Development after the entry to WTO: Agricultural industrialization, internationalization and urbanization towards sustainable development

The development in industrialized countries has demonstrated that industrialized agriculture based on economy of scale and advancement of technology can help farmers to optimize their inputs, maximum theirs profit and increase total income. The stagnation of income increase of Chinese farmers can be traced to production on a small household scale and surplus of labor input, which even lead to negative marginal product, besides the cost increases due to the rising prices of inputs and taxes as well as duties and fees for farmers. [38] Ye (2001) estimated that land per farmer in China is only 0.2 ha against 52.6 ha per farmer in U.S. in 1995. The small-scaled production mainly focuses on labor input and leaves it impossible for mechanization and expansion of new cultivation technology as well as new varieties of products. Although China has achieved high output on fairly limited land, the inefficiency embodied by farmer's stagnation in income increase jeopardizes agriculture development and contributes to the widened income inequality between urban and rural areas.

Governments have implemented agriculture development strategies of industrialization, internationalization and modernization.[39] These strategies proposed by Premier Zhu (2002) focuses on the application of comparative advantages based on different endowments and featured on added- value and profitability, such as horticulture and fruit production in the eastern regions, bulk product on economy of scale in the inner regions and locally specialized fruit, herb and cotton production in the western regions. Agricultural industrialization also features on advancement of production from crop cultivation to more profitable livestock raising and to food processing, packaging and distribution as well as agricultural tourism. These value-added development help farmers' income increase and transfer from land-oriented to agriculture-related industry.

This strategy also aims to expand international market. Huang, Rozelle and Zhang (2000) pointed out that China's agriculture commitments have outlined framework of an efficient agricultural sector, including labor-intensive horticulture and animal product. In 2001, agricultural export increased by 5.2% to US$11.8 billion, among which labor-intensive products account for 63% of the value (EIU Country Report (China), Feb 2002). China has comparative advantages on labor costs which benefit the export of fruits and vegetables and livestock products. These products have increased market shares in the neighboring countries. According to statistics in Japan vegetable imports from China reached 1 million ton, about 45% of vegetable import in Japan in 2000. Although consumers benefit from cheap imports from China, countries of import worry about dumping of these products and damages to domestic producers. It is reported China and

Japan had serious trade conflicts initiated by special tariffs on the import of some vegetables from China to Japan in 2001.[40]

WTO accession will provide China with legal instruments to settle these bilateral or multilateral problems through negotiation and audition mechanism in WTO. The accession helps the advancement of market-oriented reforms. The open of distribution and supply system will enable farmers to operate according to market information and adjust their input and output. Governments encourage private companies in the production circle to increase its efficiency. One of the well known private feed company, Fortune Corporation builds its reputation on high quality and flexible prices and becomes on of the major players in the feed market. The accession will help to expand international markets. Governments also encourage new forms of cooperation between production and distribution, such as "contract farming" to build stable channels to the market and guarantee farmers' income. An (2001) analyzed the development of vegetable export from China to Japan and demonstrated the export potential through contract farming between these two countries.

Ye(2001) summarized the benefits of the WTO entry. Trade liberalization will give China more accesses to the international market. The accession to WTO will help market liberalization, reduce market distortion and increase production efficiency. China can benefit from stable most-favored-nation treatment (MFN) unconditionally, tariff reductions from Generalized System of Preference (GST) and other favored treatment for developing countries. China can improve competitiveness in agriculture from international trade, through the adjustments of the structure of the agricultural sector based on cheap labor costs and update production technology and standards complied with WTO requirements. The mechanism of negotiation in WTO can also help China to address trade disputes with its partners. Furthermore, Kerr and Hobbs(2001) showed that maybe a significant benefit is that, as the largest developing country, China can participate the negotiations and maximum its interests through rule making procedures.

Furthermore, Colby, Diao and Tuan(2001) also pointed out that according to GATT Agriculture Agreement, the sensitive TRQs system are only 5% of total annual domestic consumption of bulk products, which is the base line to maintain self-reliance policy in China's agricultural production. We can estimate from the data in Table 1-2, the sum of TRQS of corn, rice and wheat in 2004 reaching 26 million tons, around 5% the average domestic grain production, 480 million tons in recent five years. TRQs are theoretically upper limit amount of import products with low tariffs, which may not be reached in the real transactions. Moreover, China can apply special protection mechanism against excessive import of TRQs products with special tariffs when the import amount significantly exceeds the average of the past 3 years over the quota or the imported prices are 10% or lower than reference prices.[41] The establishment of new trading right system will be in the coming three years. Under these conditions, governments still maintain the fundamental self-sufficient agriculture system over a considerate time. In addition, the value-added tax (VAT) can play an important role in import and export against the cut of the tariffs on agricultural imports complying with GATT rules, according to The Agreement of China's Accession to WTO. The fundamental rate of VAT is 17% of the selling price. Imported goods will be added VAT on tariff prices. Governments have also successfully implemented VAT rebates for exports.

In addition, governments should pay more attention to the research and improvement of quality standards complied with WTO requirements. Although agriculture products from China can benefit from the "Non-discrimination " principle of WTO, the inferior quality and sanitary level of the products to importing countries, especially developed ones will face difficulties in accordance with the local requirements in environment, food safety and nutrition, suffering from technological barriers after their tariff reduction. For an instance, Europe Union recently forbid the import of livestock products from China with specific sanitary and phytosantitary standards (SPS).[42] Green Box rules permit governmental input in technique supports and researches. Schulman, Marin and Kelman (2000) pointed out the benefits that farmers in New Zealand received from implementation ISO14000 certified EMSs with excessive international market accesses, increasing demand for their products and premium in prices. The accesses to the international market will push technology advancement in agriculture. In the annual reports (2002), the government urges the development of "green agriculture" and "ecological agriculture", such as organic farming and hazard-free farming with little inputs of synthetic fertilizer and chemical pesticides, complying with international standards and certification because they are not only with technique improvement, but also profitable and environmentally friendly to address consumer demands.

Governments also affirms the development of food inspection, grading and labeling regulations to address the increasing environmental and food safety concerns in the consumers, which can also work for protection of domestic industry in accordance with the application of SPS and environmental concerns. China has implemented labeling program for agricultural products, such as "Green Food", and started researches of establishing identity preservation (I.P.) systems to addressing needs of food safety. Recently, China has forbidden the import of Genetic Modified Organisms (GMOs) products in 2002 (EIU Country Report (China), Feb 2002).

Township enterprises (T.Es.) have successfully provided sources for labor surplus in agriculture. TEs in the eastern regions have benefited from the geographical advantages to absorb local labor and investment and accesses to international market with higher growth rates than those of inner and western regions. Since 2000, China has implemented strategies to boost the development of western regions. With the increased governmental investment in infrastructure such as roads, electricity and communication, the market accesses will be widened. It is helpful for western TEs with comparative advantages in natural resources. People's Daily reported that economic growth in those regions reached 8.5% in 2001, higher than the national average of 7.3%.

Governments push forward urbanization in rural areas to boost rural development. The development of TEs is an important part in the strategies of industrialization and urbanization towards modernization. The coastal areas have revealed the trend of modernized agriculture through industrialization with high value-added products on the economy of scale and co-operatives in the supply and marketing chain as vertical integration, alongside the TEs booming. The income growth in these regions leads to increasing and diversified demands in services such as entertainment, transportation and education. These lead to local investment and job creation. When these happen at village levels with the development of the infrastructure and immigrated labor, urbanization happens.

The incentives of policy maker to push forward urbanization in rural areas are also related to current preferred policy in industrial and urban area. Although this is a promising trend, this policy in some sense circumvents the problems of labor immobility. Since the adjustment of economic structure , especially the restructure of SOEs has created 12 million laid off or unemployed worker in cities, governments have to face the employment of these people. However, the existence of 100 million rural migrants in urban areas will put pressure on the authorities to transform the current labor policies. Premier Zhu (2002) affirmed the importance of economic growth on creation of employment. According to Lewis development model, only the developed industry can absorb surplus labor from agriculture. With 2/3 population in rural areas against the average of 10% in the developed countries, it seems China has a long way to go to allocate labors before it can become an industrialized country.

Lu (2002) pointed out that the current level of urbanization in China is 36% against the world average of 45%. The rural urbanization strategy has problems in absorbing surplus labor for its low population density and capacity to create new employment in the service industry. Table 1-3 shows that China has the labor share is 50% in the agricultural sector against that of the average of Japan and US about 2% while the GDP share in the service industry in China is 33% with labor share of 27% against the average in Japan and US of 66% of GDP share and 65% of the labor share. It is reasonable to boost the service industry in urban areas to absorb labor, including rural labor. It is based on the fact that compared with industry structures in developed countries, China has much larger of labor in the agricultural sector and much less share of GDP in service industry, which implies the possibility and potential for the development of labor-intensive service industry and the transfer of labor from the agricultural sector alongside the industrialization and urbanization from the experience in industrialized countries .

Table 1-3 The comparison of GDP share and labor share among China, Japan and U.S.
(Data from Lu(2002)P67,P55)

COUNTRY	CHINA(2000)		JAPAN(1995)		U.S. (1995)	
INDUSTRIES	GDP SHARE	LABOR SHARE	GDP SHARE	LABOR SHARE	GDP SHARE	LABOR SHARE
AGRICULTUR	17%	50%	2%	10%	2%	5%
MANUFACTURE	50%	23%	38%	30%	28%	25%
SERVICE	33%	27%	60%	60%	72%	70%

Sustainable development (SD) is as one of the fundamental strategies in China's development. Governmental strategies of agricultural industrialization and urbanization and western region development aim at the balanced development between rural and urban areas, between eastern and western regions. Efficiency and equality are not sufficient to realize SD without the improvement of degraded environmental situations. Governments (2002) also confirm to encourage ecological agriculture and implement programs of reforestation and soil rehabilitation in the north and the upper valley of river areas against the threats of drought and floods.

However, it is estimated the anti-sandstorm program in the north only will cost RBM54billon (US$6.8billion).[43] The constrained fiscal budgets and investment shortages may have further difficulty in financing these ecological program.

Tweeten pointed that poverty and environmental degradation can be traced to institutional failure and can be improved through social and institutional reform. At the micro level we expect the land reform will give farmers more rights on the land so that they can improve the local environment with better cultivation and less abusing.

Lopez (1997) showed that to realize sustained development, we should restrain population growth, slow environment dynamics and accelerate institutional dynamics. China affirms the implementation of Sustainable Development strategy and implements 21st Century Agenda in 1992, wit birth control , reducing the exploitation of natural resources and protecting environment , aiming to reach the zero population growth rate and the equilibrium use of renewal resources in the early 21 century. In recent 20 years, family planning projects have made achievement to reduce the birth rate to 0.9% annually. China has already implemented many environmental projects in controlling the pollution in the big rivers and lakes regions in the industrial areas. Only with environmental amenities taken into the whole development strategies, can we expect a economically and socially and ecologically sustainable development.

4.Conclusion:

"Agriculture, Rural Areas and Farmers" features in the aspects economic growth, equality and sustainability as the essence of agriculture development in China. China has achieved significant agriculture development in the recent 20 years along the market-oriented reform. The governmental interventions have played important roles in stabilizing farmers' income and supports and aids (World Bank 1991). Applying, purchasing-power-parity measurement, China's real GDP has exceeded Japan as the second largest economy in the world since 1997. [44] However, the self-sufficiency based policies in agriculture has distorted market operation in price and production mechanism, causing inefficiency in allocation of production factors of capital, labor and land as well as in distribution of products. Furthermore, these policies jeopardize further growth and enlarge income inequality and contribute to worsened environment. After WTO accession, the self-reliance policies are facing great challenges.

Through the analysis in this paper, we find WTO accession will push forward the market-oriented reforms in the agricultural sector in foreign trade and distribution. It is that policy makers are in urgent needs to deal with how to balance between the efficiency of market mechanism and governmental interventions to realize healthy agriculture development with self-sufficiency. Actually, the government can improve land use regulations and play important roles in the way of investment, technology aids and education , complying with WTO rules. The strategies of agricultural industrialization, internationalization and urbanization towards sustainable agriculture will help to push agriculture development in a healthy and modernized path.

However, we find that with political and social concerns, especially, population pressure, the government will not abandon the basic self-support agriculture policy for a total market liberalization and trade, which are based on comparative advantages. In the short run, the industrial adjustment of state-owned enterprises in the urban areas will lead to increase of laid-off and unemployed workers and slow the pace of labor mobility from

rural areas. The extent and pace of modernization of Chinese economy will depend on the agriculture development, embodied by the solution to rural labor surplus .

Footnotes:

[1] Data from The Economist Intelligence Unit database, EIU Country Profile China 2000/2001
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