

**FEASIBILITY OF DEVELOPING GRAIN FUTURES  
MARKETS IN CHINA**

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Submitted to the Faculty of Graduate Studies  
in Partial Fulfilment of the Requirements  
for the Degree of

**MASTER OF SCIENCE**

Department of Agricultural Economics and Farm Management  
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BY

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A Thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements for the degree of

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## Abstract

This is one of the initial studies to examine the development of the grain futures markets in China. The current grain marketing system is composed only of cash markets. It performs limited functions and therefore is incomplete. Thus, an improved perfect marketing system requires the introduction of the futures markets into the grain sector, since the futures markets can provide price risk transfer for grain sector in China.

The establishment of grain futures markets requires some external conditions, especially under China's different social structure. The study finds that most conditions which include political ideology, transportation, communication, storage, grading, and a new understanding of business could be satisfied. Some issues such as accounting standards, RMB currency convertibility, efficient money transfer, trade matching systems, and the acceptance of speculators are now being considered. In addition, some key issues including the property rights under the public ownership, agricultural policy, law and regulations, and grain cash market system are analysed. It is found that the Chinese government paid increasing attention to defining the property rights adequate to market economy and tried to give enterprises the true owner of producers and managers. Agricultural policies which involve grain pricing policy, financial policy, isolation of regional market, and distribution policy are being improved to be in favour of the establishment of grain futures markets. A competitive, efficient and price volatile grain cash market system which was composed of three levels of cash markets throughout the country is being formed. However, there is an urgent need for a law governing futures

markets, trading, and establishing an administrative agency.

Furthermore, this study finds that although futures trading is a standardized transaction activity and has formed an international tradition, the establishment of grain futures trading under the particular social forms in China could have its own characteristics. These characteristics include forms of public ownerships, quasi market economic environment, a major net importer rather than a exporter of grain, and a different starting point from the industrial countries. Based on a full consideration of these characteristics, two scenarios of grain futures markets which would take advantage of local conditions are suggested. For the Zhengzhou market, following a natural evolution process from the cash market, to a forward market, and then to a futures market seems to be the best alternative. Zhengzhou market at its initial stage of development is suggested to mainly introduce the hedging business supplemented by some speculative businesses, and would be limited to domestic transaction. For Shanghai market, the alternative for developing grain futures markets would be the direct introduction of grain futures trading. From the outset the Shanghai market could be designed to face the international market and try to attract participation of both domestic and international traders. In addition, the Shanghai market could attract many speculators to participate in futures trading. As far as the contract specifications of particular grains are considered, both markets should trade different varieties of this grain in order to avoid direct competition for limited amount of grain available to the market.

Finally, an electronic cash market is recommended to improve the cash market system and some measures for implementing the electronic cash market are suggested.

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# CHAPTER 1

## INTRODUCTION

### **Statement of the Problem**

The Chinese government has put forward and carried out a policy of reform and opening to the outside world since 1978. Under the guidance of this policy, the state monopolistic purchasing and marketing system through which the government influenced prices has been gradually relinquished and the price control of most agricultural products removed. For some major grains such as wheat and rice, which were strictly controlled by the state, the previous single price system was replaced by "double-track price" system which involved a planned price and the market price. Farmers have been allowed to sell surplus grain in the cash markets for market prices after they fulfilled the state's procurement quota.

The introduction of this policy stimulated the development of the grain cash markets as well. The importance of the cash market in grain production and distribution has been increasing quickly. The state grain departments have gradually become the major participants in the cash markets. Although they purchased grain through both the contract procurement and cash market channels, the amount of quota procurement gradually decreased and the share of grain purchased in the cash markets increased. Currently, the Chinese government is preparing to open up the prices of all grain, except for the establishment of "state grain reserve system" under which a certain amount of grain will

still be purchased by the central government through the contract system. By the end of April 1993, some 1300 counties and cities had opened up grain prices.

With the change of the grain marketing policy, the role of the cash markets expanded significantly and the amounts of grain traded on the cash markets quickly increased. The grain prices on the cash markets became more volatile over time. This volatility was caused by many factors which mainly involved agricultural policies and weather. The frequent change of policies and fluctuations in the weather caused large fluctuations in grain production and these, in turn, affected prices because of the relatively inelastic supply and demand.

Under these circumstances, all market participants faced price fluctuation or price risk. Farmers were often directly exposed to price risks, and unfavourable fluctuations of prices affected their production incentives and their marginal income from planting grain. The grain departments at different levels of governments, which were sole buyers of grain in the past and now are basically self-managed enterprises, also had to face price risks since they no longer received subsidies for their businesses from the central government. Other buyers such as grain processors, food industries and livestock producers who used to get rationed grain at the planned price from the government must now purchase grain on the cash markets and are exposed to price risks as well. Since the central government is ready to open up the grain prices and discharge the financial burden of subsidizing the gap between increasing purchasing prices and artificially low sale prices, all market participants will bear the price risks through the market channels. They must look for other mechanisms to transfer their risks in order to secure some protection from sudden

changes in prices. The introduction of the grain futures markets may satisfy this economic requirement.

Although the grain futures markets have existed for 150 hundreds years in the West, they are one kind of market which has never been practiced in China. Recently, dramatic changes have been taking place in Eastern European (a major area of agricultural production) and there is much talk about those countries establishing their own futures exchange. Some countries such as the Czech and Slovakian Republics are undertaking preparatory work to create exchanges for agricultural commodities. Obviously, Eastern Europe, a former centralized economic bloc, is also searching for various forms of free market forces for salvation. Likewise, freeing up the Eastern European markets for agricultural commodities requires some way to reduce price risks and seek price discovery. For these reasons, the development of futures markets for agricultural commodities has become a common requirements in many former centralized countries.

However, there are very few studies on the feasibility of developing grain futures markets in China, or even in the former socialist countries, according to Hu and Boyd. This raises some interesting questions. Why do grain futures markets need to be developed under a market economy system in China ? Is it appropriate to introduce the grain futures markets at the current stage of economic development ? Do the appropriate outside conditions for creating grain futures markets exist? What characteristics should the grain futures markets in China have? What major problems should be solved for successful grain futures trading ?

To answer these questions it is necessary to study and evaluate the performance of current grain marketing, and the importance and feasibility of establishing grain futures markets in China in a broad framework. These include: a) realistic requirements for the improvement of grain production and distribution; b) necessary conditions and foundation on which developing the grain futures markets rests; and c) the feasibility of creating grain futures markets with Chinese characteristics at the current stage of economic development. All three aspects are logically related to each other and serve the same purpose -- to speed up the establishment of grain futures markets and improve the grain marketing system.

During the past decade, the major objectives of economic reforms in China were to raise productivity and reform the centralized-planned system. The state attempted to raise farmers' incentives to plant grain through increasing the farmgate prices and then stimulate producing more grains. At the same time, improving productivity also contributed to more grains to meet the state purchase requirements. However, as a result of keeping retail prices artificially low for political reasons, the state drained a vast amount of finances to subsidize the gap between a high purchase price and a low retail price. The increase in productivity made the state finances worse and even unsustainable. The central government was not willing to continuously undertake responsibility for bearing risks and tried to transfer them to the local government and other market participants.

In addition, the development of the cash markets made the prices of grain more volatile. All market participants had to face more price risks than before, and hope to

transfer them elsewhere. Since the state cannot continue to bear these risks in grain production and distribution, the grain futures markets which can transfer price risks, reduce price fluctuations and discover prices seems to be a logical choice at current economic development stage. Thus, the development of grain futures markets could meet requirements for the improvement of the grain production and distribution.

The establishment of the grain futures markets requires some basic conditions to be met. It is necessary to study the outside conditions required to establish the grain futures markets in the current economic environment in China. According to Duncan (1992, pp.xx-xxiv), seven factors on which futures trading rests are necessary, in addition to legal and political considerations. These include: 1) transportation; 2) communication; 3) storage; 4) grading; 5) warehouse receipt; 6) new view of speculation; and 7) new understanding of business. Obviously, other conditions such as law and regulation, an efficient financial system and developed cash markets are also very important. This study in turn tries to identify whether or not the existing conditions in China meet the requirements for grain futures trading and which ones need to be further improved.

In recent years, the market economy in China developed very fast. The number of grain cash markets and their role increased quickly. Normal cash grain markets were also established throughout the country. Among them, Zhengzhou and Shanghai Wholesale Grain Markets which are the two national wholesale grain markets, have even introduced some elements of futures trading. More importantly, some futures markets for other commodities have been established and begun to successfully operate in China. All these developments provide a positive experience for creating grain futures markets.

However, because of different social forms than in the West, the development of grain futures markets in China would also have their own particular characteristics, especially at the initial development stage. This study tries to determine these characteristics and shed light on some critical issues to be addressed for successful grain futures markets. Furthermore, two scenarios to develop grain futures markets with their respective characteristics will be suggested.

In addition, an efficient and competitive cash market system is considered as the most important condition for developing the grain futures markets. Under such a system, the price difference between regions should only reflect the transportation and handling cost. The price difference over time should cover the storage and interest cost. Accordingly, an efficient and competitive grain cash market system becomes an important part of improving the grain market system. This study analyzes the importance of the organized cash grain markets and suggests further measures of improving these markets.

In summary, the fact that the Chinese government is preparing to establish grain futures markets confirms the significance and role of the futures markets in the context of strategies to develop a market economy. However, the grain futures market is still a new form of market in the centralized economy. This study will try to analyze the necessity of introducing the grain futures markets and whether the outside conditions for creating the futures markets are appropriate. It then suggests two scenarios for the grain futures markets with Chinese characteristics, with the discussion of some critical problems to be solved.

## **Objectives and Methods**

The objectives of this study are to determine the feasibility of creating grain futures markets with Chinese characteristics and further suggest the types of several grain futures markets with their own respective attributes in China.

The specific objectives of this study are:

1. to analyze whether the grain futures markets will be able to improve current grain distribution and production in China;
2. to analyze whether the economic environment and conditions are adequate to grain futures trading;
3. to identify the relationship between Chinese characteristics and international traditions in the grain futures trading;
4. to design grain futures markets with their own characteristics in China; and
5. to discuss the importance of organized cash grain markets and possible further improvements.

The method of analysis adopted in the study will mainly be descriptive, conceptual and qualitative. Therefore, this study focuses on the institutional aspects of the grain production and marketing, with an emphasis on futures markets.

## **Organization of the Study**

This study consists of six chapters. Following this introductory chapter, chapter 2 provides an analysis of the necessity of grain futures markets in China. Chapter 3 analyzes the conditions which make creating grain futures markets in China possible.

Chapter 4 provides primary analysis on creating the grain futures markets with Chinese characteristics and concrete suggestions about the grain futures markets at particular locations. Chapter 5 discusses the importance of improving the grain cash markets and some further measures to improve facilities and manage the cash markets. Finally, the major conclusions and suggestions for further research of this study are summarized in the sixth chapter.

## CHAPTER 2

# ANALYSIS OF NECESSITY FOR CREATING GRAIN FUTURES MARKETS IN CHINA

### Introduction

Since 1978, China's reforms have achieved tremendous growth in agricultural productivity. Productivity increases required expanding the role of market regulation and improving the marketing system. As a result, various cash, wholesale, specialized, and comprehensive markets have been set up in China. Even in the grain sector which the state always strictly controlled, as grain prices were gradually freed, the markets are playing an increasing role in the distribution of grain and allocation of resources. Consequently, cash markets developed rapidly.

However, the grain market system, composed only of cash markets, could not always perform its function well, and some problems such as price risk were simply the typical outcome of cash markets. The experience in Western industrialized countries where the market economy has developed to an advanced level, shows that the futures markets are an integrated component of a complete market system. Since China is promoting a market economy and improving market systems, developing a futures market is a requirement of improving market system. In the following sections, the requirements for creating grain futures markets will be analysed from different perspectives.

In the first section, the relationship between productivity growth and developing futures markets will be discussed; Section 2 discusses the economic reform which liberalized the system of grain marketing and the associated problems. In section 3, the functions of futures markets and their potential to improve the performance of China's grain sector is briefly discussed.

### **Necessary Trends of the Social Productivity Development**

Commodity exchanges came into being as a result of the tremendous growth of national economies during the nineteenth century in the West. In China, the economic reforms since 1978 have been recognized as being extremely successful. During the period of 1978--1992, its GNP increased by an average of 9% per year. Productivity has attained the unprecedented growth. At present, China's economy is undergoing the transformation from a planned economy to a market economy where resources are allocated by market forces. The self-sufficient and peasant economy is improving and is being gradually replaced by a specialized commercial and international economy. With the opening of the economy and the introduction of new agricultural and industrial technology, productive capacity in agriculture was increased quickly. At the same time, increased population and continuous improvement of both domestic and international trade activities opened huge new markets to absorb production increases and encouraged further expansion.

The expansion of activities and range of markets meant: 1) greater capital and credit requirements; 2) increased price risks due to long periods between production and

final sale and to greater competition among various participants in the markets. The need for working capital could be met by financial institutions. A stock exchange recently appeared in China and may help solve the requirements for the huge quantities of capital used for the new types of production. But, the stock exchange cannot solve a second problem, that is, increased price risks in commodity production. At the same time, the forward contract on the markets cannot always easily transfer price risks either. Thus, a well functioning market system needs to deal with the distribution of commodities and a mechanism of transferring price risks. As a result, improving the market system has become an urgent task of economic reform in China. Specifically, the development of commodity exchanges is a necessary objective in order to induce risk capital from speculative activities to be used to transfer price risks which occur in the process of commodity production and marketing.

### **Requirements of Economic Reform**

The agricultural reforms worked so well that output of agriculture, and grain particularly, rose sharply in the early 1980s. The rapid increase of grain production and the reform of grain prices raised the practical need to establish futures markets for grain in China. On the one hand, the amount of grains provided to the market increased rapidly because of specialization and commercialization of grain production. On the other hand, with the price reform, the traditional planning system of grain procurement by the state was gradually diminished and the role of the market became more important. After the policy of unified procurement and sale of grain was abolished and replaced by contract

purchase system, the market is playing larger role in the adjustment of production, distribution and consumption of grain.

### ***Current Problems in Grain Production and Marketing***

However, as the role of market adjustment increased, this brought about some very frustrating issues as well. These include

1. increasing fluctuation of grain prices in the cash markets over time;
2. cyclical swings of grain production;
3. serious damage to the interests of producers and consumers;
4. escalating financial burdens for the government; and
5. market disfunctions caused by bureaucratic intervention, halting reform.

### ***Grain Price Variability Over Time***

The market prices of grain fluctuated significantly from year to year during the last decade. However, under the "two-track system" (which means planned price and market price) for grains, the movement of the market prices of grains, unlike that of commodities with liberalized prices such as meat, fish, vegetables and fruits, reflected the partial protection of the grain sector. Grain prices in the markets were unavoidably affected by the state purchase policy. In the first half of the 1980s, grain production increased faster than state purchases and thus market prices were depressed. The market price of grains fell, on average, by about 2 percent each year. During the second half of the decade the trend was sharply reversed because of the continuous drop of grain

production for four years, market prices rose by an average of 14.5 percent per annum. Following four years of sharp price increases, the market and negotiated prices of main grains (rice, corn, and wheat) dropped 32.27 percent and 24.43 percent from August 1989 to December 1991, respectively (The People's Daily, January 9, 1993). In the Zhengzhou Grain Wholesale Market where the state policy did not interfere, prices of grain displayed drastic fluctuation over time. Even though the state protected the price of corn, the corn price fluctuated more than 50 percent (Tian Yuan, 1989).

### *Stagnation of the Grain Production*

In terms of the growth of grain output the reforms were, initially at least, impressive. For example, grain output increased from 304.77 million metric tons in 1978, to 407.31 million metric tons in 1984 (Table 2.1). Because of the high yields from two consecutive bumper harvests, market prices plummeted drastically at the end of 1984. Consequently, farmers' incentives for grain production declined after years of sustained enthusiasm to produce more.

Since 1984, fluctuations have occurred in China's grain production. Compared to 1984, output in 1985 dropped by 28.2 million metric tons. Although grain output grew in the years after 1985, it never reached the 1984 level, and did not surpass it until 1989. In 1989 grain output was 0.24 mmt higher than that in 1984. However, the slightly higher output was made possible only by expanding cultivated land devoted to grain by a substantial 2 million hectares. Similarly, the 1990 increase of grain output was reached by expanding another 2 million hectares (see Appendix A Table A.1). In other words, the

Table 2.1 The Production of the Main Grains in China (million metric tons), from 1951 to 1990.

Year	Grains	Rice	Wheat	Corn	Soybean	Potato <sup>a</sup>
1951	143.69	60.56	17.23	N.A. <sup>b</sup>	8.63	14.00
1952	163.92	68.43	18.13	16.85	9.52	16.23
1953	166.83	71.27	18.28	16.69	9.93	16.66
1954	169.52	70.85	23.34	17.14	9.08	16.98
1955	183.94	78.03	22.97	20.32	9.12	18.90
1956	192.75	82.48	24.80	23.05	10.24	21.85
1957	195.05	86.78	23.64	21.44	10.05	21.92
1958	200.00	80.85	22.59	N.A.	8.67	32.73
1959	170.00	69.37	22.18	N.A.	8.76	23.82
1960	143.50	59.73	22.17	N.A.	6.39	20.35
1961	147.50	53.64	14.25	15.49	6.21	21.73
1962	160.00	62.99	16.67	16.26	6.51	23.45
1963	170.00	73.77	18.48	20.58	6.91	21.39
1964	187.50	83.00	20.84	22.69	7.87	20.13
1965	194.53	87.72	25.22	23.66	6.14	19.86
1966	214.00	95.39	25.28	N.A.	8.27	22.53
1967	21.782	93.69	28.49	N.A.	8.27	22.43
1968	209.06	94.53	27.46	N.A.	8.04	22.29
1969	210.97	95.07	27.29	N.A.	7.63	24.12
1970	239.96	109.99	29.19	33.03	8.71	26.68

Notes:

<sup>a</sup> potato includes sweet potato.

<sup>b</sup> N.A. = not available.

Sources:

State Statistical Bureau, *Zhongguo tongji nianjian, 1991* (*Statistical Yearbook of China, 1991*) (Beijing: Statistical Publishing House, 1991).

Table 2.1 The Production of the Main Grains in China (million metric tons), from 1951 to 1990 (Continued).

Year	Grains	Rice	Wheat	Corn	Soybean	Potato <sup>a</sup>
1971	250.14	115.21	32.58	35.85	8.61	25.07
1972	240.48	113.36	35.99	32.10	6.45	24.52
1973	264.94	121.74	35.23	38.63	8.37	31.56
1974	275.27	123.91	40.87	42.92	7.47	28.24
1975	284.52	125.56	45.31	47.22	7.24	28.57
1976	286.31	125.81	50.39	48.16	6.64	26.66
1977	282.73	128.57	41.08	49.39	7.26	29.67
1978	304.77	136.93	53.84	55.95	7.57	31.74
1979	332.12	143.75	62.73	60.04	7.46	28.46
1980	320.56	139.91	55.21	62.60	7.94	28.73
1981	325.02	143.96	59.64	59.21	9.33	25.97
1982	354.50	161.60	68.47	60.56	9.03	27.05
1983	387.28	168.87	81.39	68.21	9.76	29.25
1984	407.31	178.26	87.82	73.41	9.70	28.48
1985	379.11	168.57	85.81	63.83	10.50	26.04
1986	391.51	172.22	90.04	70.86	11.61	25.34
1987	402.98	174.26	85.90	79.24	12.47	28.20
1988	394.08	169.11	85.43	77.35	11.65	26.97
1989	407.55	180.13	90.81	78.93	10.23	27.30
1990	446.24	189.33	98.23	96.82	11.00	27.43

Notes:

<sup>a</sup> potato includes sweet potato

Sources:

State Statistical Bureau, *Zhongguo tongji nianjian, 1991 (Statistical Yearbook of China, 1991)* (Beijing: Statistical Publishing House, 1991).

achievements were gained at the expense of reduced output for other crops and were not the result of productivity growth. Thus, grain production did not yet walk out of the stagnation situation.

#### *Damage of Consumers' and Producers' Interests*

The great fluctuation of grain prices in the cash markets brought the farmers large benefits at one time and huge losses at another. Prior to 1985, the market prices of grain were always higher than the state prices. This signalled to farmers the de facto marginal price. The incentives for grain production increased since farmers could get a large benefit from their surplus grain production. However, market prices declined so drastically at the end of 1984 that they had fallen below the new contract price. This situation quickly resulted in relatively huge losses for grain farmers and reduced the farmers' incentives to produce grains. The poor performance of grain production in 1985 quickly led to a rebound of the market price of grain in 1986, and farmers could make profits again in grain production. However, fearing that the market rebound would tempt farmers not to fulfil their sales contracts with the state, the state tightened its enforcement measures. Under the system known as "second purchase", farmers were obliged to sell more to the state at the negotiated prices. That is, farmers had little remaining surplus to dispose of in the market (where prices were higher). This dual mechanism of government intervention and market adjustment made the farmers' grain production decisions like gambling and they often did not know how to deal with it.

On the buyer side, the consumers also faced increasing risk of price fluctuation on the cash market as the state gradually reduced and eventually stopped selling subsidized grain to consumers. Processors and food enterprises, particularly, who used to get the subsidized grain supply from the state faced greater price risks since they had to get their entire grain supply from the cash markets. Thus, they also faced the situation of huge losses or large profits brought about by their exposure to the price fluctuation in the cash markets.

#### *The Unbearable Financial Burden for Grain Subsidization*

Another difficulty was growing budgetary losses as the state tried to protect the interest of both producers and consumers through bearing the price risks. The reforms were intended to enhance farmers' production incentives (see Sicular, 1988) by generously raising farmgate prices. From 1956 to 1985, the quota price was raised by 141.3 percent. Considering the above quota premium, the average price increased by 229.0 percent. On the other hand, retail prices of grain in urban areas were kept almost constant during the same period. It was believed that the supply of inexpensive grain to urban industrial workers who earned a low salary could ensure political stability, and hence it was inappropriate to raise the retail prices of grain. The state simply continued to subsidize grain purchasing department out of state revenue. During the last 30 years, the price difference between the purchase and resale prices has widened to about 90-100 percent, with the resale price being lower than the purchase price (Table 2.2). In addition, the state also incurred marketing and distribution costs.

Table 2.2 State Quota Procurement and Retail Grain Prices Indexes (1965=100), from 1950 to 1988.

Year	Quota price index	Retail price index
1950	52.4	76.2
1951	62.0	78.9
1952	63.6	85.4
1953	71.8	92.1
1954	71.8	92.2
1955	71.9	92.2
1956	73.3	92.2
1957	74.1	91.8
1958	76.0	91.9
1959	77.0	92.1
1960	79.5	92.7
1961	100.5	93.2
1962	100.8	93.3
1963	100.0	94.4
1964	99.1	94.8
1965	100.0	100.0
1966	115.7	104.8
1967	115.8	110.4
1968	115.8	110.4
1969	115.8	110.4

Sources:

Liu Zhuofu, 1982.

State Statistical Bureau, *Zhongguo shangye huaijing tongji zhiliao, 1989* (Chinese Statistical Material of Commercial and Foreign Trading Economy, 1989) (Beijing: Statistical Publishing House, 1989).

Table 2.2 State Quota Procurement and Retail Grain Price Indexes (1965=100), from 1950 to 1988 (Continued).

Year	Quota price index	Retail price index
1970	115.8	110.4
1971	116.3	110.4
1972	116.4	110.4
1973	116.4	110.5
1974	116.5	110.5
1975	116.7	110.5
1976	116.7	110.5
1977	116.7	110.5
1978	117.5	110.5
1979	142.1	112.2
1980	140.8	111.3
1981	154.5	111.5
1982	160.4	111.8
1983	176.9	111.7
1984	198.1	111.5
1985	201.7	123.6
1986	221.7	135.1
1987	239.4	143.5
1988	274.4	163.7

Sources:

Liu Zhuofu, 1982.

State Statistical Bureau, *Zhongguo shangye huaijing tongji zhiliao, 1989* (*Chinese Statistical Material of Commercial and Foreign Trading Economy, 1989*) (Beijing: Statistical Publishing House, 1989).

These asymmetric developments in the purchasing and marketing of grain in China after 1979 contributed to rising food subsidies in the early 1980s. As Table 2.3 shows, subsidies on the sale-procurement price gap of food grains, edible oil and cotton alone soared from a mere 1.114 to 20.167 billion yuan between 1978 and 1984. Viewed in terms of the state revenue, such outlays were equal to 4.41 percent of total fiscal revenue in 1978 and 18 percent in 1984. In order to avoid a worsening fiscal situation and an unmanageable stockpile of grain surplus, the state has abolished the compulsory procurement system after 1985, trying to release itself from the previous obligation to purchase all the surplus from the farmers. However, the subsidies under contract purchasing system still exceeded 40 billion yuan (\$7.4 billion U.S. at current rate of 5.40) in 1989 and reached 47 billion yuan (\$8.7 billion U.S.) in 1990 for grain only. China's entire state revenue in 1990 was little more than 330 billion yuan (\$61 billion U.S.) (China Daily, March 12, 1992). Obviously, under the "double track" pricing system it will be hard for the state to fund the deficits in grain distribution.

#### *Market Disfunction in the Process of the Grain Distribution*

Although grain production increased 46 percent between 1978 and 1990, in absolute terms China did not have too much grain. The problem was that farmers were not diversifying their use of grain for feed and sideline uses, but were selling it to the state for food grain. The dramatic rise in grain sales created a series of new problems for the state. On the one hand, grain procurement costs for the state soared. State storage capacity was quickly outstripped. The overloading of the state infrastructure and the grain

Table 2.3 Fiscal Expenditure on Food Price Subsidies, Mainly Grain, Edible Oil, and Cotton (Rmb 100 millions), from 1978 to 1989.

Year	Grain, Cotton, and Edible Oil Price ( Sales-Procurement Price Gap)	Price Subsidies on Agricultural Producer Goods	Price Subsidies on Five Imported Commodities <sup>a</sup>	Total price Subsidies	Fiscal Revenue of Both Central and Local Governments	Revenue from Borrowings <sup>b</sup>	Adjusted Fiscal Revenue	Total Price Subsidies as a % of Adjusted Fiscal Revenue
1978	11.14	23.91	14.35	49.40	1121.10	0.00	1121.10	4.41
1979	54.85	21.79	22.90	99.54	1103.30	35.31	1067.99	9.32
1980	102.80	20.41	43.10	166.31	1085.20	43.01	1042.19	15.96
1981	142.22	21.74	88.26	252.22	1089.46	73.08	1016.38	24.82
1982	156.19	21.35	56.79	234.33	1123.97	83.86	1040.11	22.53
1983	182.13	13.46	58.68	254.27	1248.99	79.41	1169.58	21.73
1984	201.67	8.15	41.00	250.82	1501.86	77.34	1424.52	17.61
1985	198.66	6.96	17.59	223.21	1866.40	89.85	1776.55	12.56
1986	169.37	9.75	13.34	192.46	2260.26	138.25	2122.01	9.07
1987	195.43	10.57	17.67	223.67	2368.90	165.87	2203.03	10.15
1988	204.03	N.A.	N.A.	N.A.	2628.02	261.01	2367.01	N.A.
1989	259.47	N.A.	N.A.	N.A.	2919.20	274.30	2644.90	N.A.

Notes:

<sup>a</sup> The five commodities are grain, cotton, sugar, chemical fertilizers, and agricultural pesticides.

<sup>b</sup> Debts (both internal and external) are treated as revenue in the Chinese Government fiscal system.

Sources:

State Statistical Bureau, *Zhongguo tongji nianjian, 1989 (China Statistical Yearbook, 1989)* (Beijing: Statistical Publishing House, 1989); *Zhongguo tongji nianjian, 1991 (China Statistical Yearbook, 1991)* (Beijing: Statistical Publishing House, 1991).

departments' reluctance to buy grain quickly affected the farmers' grain sales. On the other hand, cash markets did not function very well because there were too few independent buyers, inadequate facilities, and administrative barriers between regions. As a result, farmers experienced difficulties in selling their grain in some production areas.

Granary cadres took advantage of the buyer's market and used their bureaucratic power to decide whose grain would be purchased and at what price. Thus, the difficult situation farmers faced in selling grain was worsened by corruption among the cadres. When farmers sold grain each batch was graded and priced accordingly. If the granary cadre said that the grain was of poor quality, the farmer received a lower price. Some cadres unfairly lowered their valuation of a farmer's grain and paid a lower price. Farmers desperate to sell their grain had to accept what was obviously an unfair price, or forfeit the opportunity to sell to the state.

In the regions of surplus grain production, the free markets, historically a place where grain prices were at least double the state procurement prices, offered little relief for farmers with a surplus because of a lack of independent traders or non-state agencies, insufficient transport and communication facilities and barriers between administrative divisions. Market channel disfunctions and the upsurge in production depressed market prices. In some areas, grain prices in the free markets were below the "above quota" prices. This further affected the farmer's incentives to produce grains and slowed the reform of the grain sector.

### *Limitations of the Cash Markets in Grain Distribution*

The main channels of grain distribution in China were the state marketing system and cash markets (including cash wholesale markets and township free markets). However, the cash markets have some limitations as a supplement for the distribution of grain. First, the cash markets reflect only the immediate relationships between demand and supply and prices. Farmers used the past and current prices on the cash markets as a basis to make their production decisions, thereby usually causing cobweb effect similar to the early stages of the commodity economies in many industrialized countries. These also experienced the cyclical fluctuations of production and prices on the grain markets which now happen in China. Second, the cash markets lack the mechanism of transferring risks and protecting prices.

However, the socialist market economy is still a risk economy. High and low prices and gains and losses on the cash markets have to be borne by the producers and consumers directly. The risks cannot be transferred in the cash markets. If the state wants to protect producer's and consumer's interests, it has to bear the risks by using its huge budget to support production and subsidize consumption. Third, the cash markets carry on only short-term transactions, and lack long term predictability. The cash markets cannot generate expected prices. In fact, producers, consumers and the state all care about expected prices of the grain in order to manage their production, consumption and practice macro-planning control properly.

In addition to these limitations of the cash market itself, organization and regulation of the grain markets in China have not advanced to the levels in the

industrialized countries. At the same time, the existence of the "double track" pricing system in grain sector had an unfavourable effect on the development of the cash market system since state contract procurement often distorted grain prices on the cash markets.

In order to secure some protection from sudden changes in prices, the state helped to develop the cash wholesale (forward) markets under which both buyers and sellers can trade forward contracts for the delivery, at some agreed time in the future, of a specified quantity and quality of a particular grain at an agreed price. However, a wholesale market is still a kind of cash market, except that a forward contract calls for delivery in the more distant, rather than in the immediate future. Such forward contracts suffered three major disadvantages, especially from the point of view of the those who wished to protect themselves against price volatility. Firstly, there was the problem of determining the contract price and ensuring that at all times it remained relevant to developments in the cash market; secondly, there was the problem of preventing either side to the contract from defaulting, if either side to the contract defaulted, the outcomes might be unfortunate; and thirdly forward contracts are more difficult to exit than futures contracts, since futures contracts are generally exited rather than fulfilled or delivered on.

Firstly, within swiftly moving and volatile cash market for grain, the continuing relevance of an arranged contract price must be regularly monitored to ensure that the interests of either side are upheld. In turn this requires a sophisticated means for price determination. Variations in the supply and demand cause price movements, which can then be applied to the underlying marketing price. Any alternations necessary can be made to the contract price, presupposing that it was not fixed in advance. It was apparent

that methods of price discovery and interpretation in the grain cash market were rudimentary. Contract prices relying upon a coefficient or increment being applied to a published price in the national market might be inaccurate if the grade or type of the grains in a contract was different from the average to which the national price applied. The frequency at which the transacted price was compiled might be only weekly such as in the Zhengzhou Wholesale Market, in which case contracts based upon this were up to a week or more out of date.

Secondly, forward contracts were inflexible since every forward contract was specific to the two contracting parties. It therefore specified quantity, quality, delivery date, and delivery location; and the price in the contract would reflect these factors as well as the value of the particular grain itself. These factors limited the value of the contract to anyone other than the two contracting parties, thus making it difficult to establish a secondary market in forward contracts. Thus, the forward contract was always at risk to default by one of the parties, which would leave the other with a less valuable contract.

Thirdly, the forward contracts are more difficult to exit since they are usually individualized to specific need and not standardized and homogenous in quantity, quality, location, and delivery time. Like many other legally binding agreements, forward contracts cannot easily be liquidated. That is, forward contracts are typically not fungible. Most forward cash contracts end in spot delivery. Therefore, since forward contracts are difficult to undo forward commitments and to liquidate transaction costs, price premiums, and search costs might be raised. As a result, while the cash wholesale grain market was

the further development of the cash market, it still had some fundamental limitations such as non-standardized contract transaction, lacking the functions of transferring risk, and non-forward pricing.

### *An Alternative Solution - Grain Futures Markets*

In the process of grain distribution on the cash markets, huge fluctuation of prices caused by many factors usually hurt the growth of agricultural production and interest of producers and consumers. Thus, many countries tried to limit price fluctuation to a limited range and even control price level artificially through government intervention. In the U.S., the government controlled the price of domestic grain consumption for political reasons and at the same time propped up production through "deficiency payments" and other price support plans in order to help producers reduce price risks. Another method of controlling price was for geographically aligned countries such as the EC to form a trading club and raise the price of grain by restricting cheap imports of grain from outside blocs, thus stimulating supply to meet a certain level of demand. The result was guaranteed high and relatively stable prices to farmers, but at the expense of huge subsidies.

Another mechanism to limit price fluctuation, without government intervention, was the introduction of futures trading. In the U.S., about 10% farmers, who did not participate in government plans, entered the futures markets to transfer price risks through hedging. This approach of reducing price fluctuation through futures trading was extremely successful in the U.S. grain sector. In China, the government used to bear the

majority of price fluctuation risks for farmers and consumers of grain through the financial subsidization mechanism. In order to reduce heavy burden from subsidization the state recently freed most grain prices for both production and consumption. Thus, an alternative mechanism to subsidies, which can stabilize the price of grain, needs to be found. Among various other schemes aimed at achieving similar results to the above might be a marketing option which was adopted by many industrialized countries, and now also is gaining popularity in China-the futures markets. Indeed, alternative strategies of solving the problems of grain production and distribution; controlling the price of grain and overcoming the limitations of the cash markets in China would involve grain futures markets since these markets have functions which could overcome the existing problems.

### **An Important Link in Improving the Marketing System**

#### ***The Relationship between the Cash and Futures Markets***

In China, as mentioned earlier, the dominant grain market form is the cash market. This market is characterized by physical delivery with prompt cash payment. It is composed of sellers who hold cash grain and are ready to deliver and buyers who want grain immediately. This market's fundamental function is transferring ownership of cash grain.

Cash markets emerged in the early stages of the development of commodity economies and was the basic form of making commodity transactions. Futures markets were developed and evolved from forward trading in the cash markets and one type of

more advanced marketing organization which is characterized as standardized futures contract. They have particular functions such as forward pricing and transferring risk. Cash markets and futures markets reflected the different stages in the development of commodity economies to market forms. Both supplemented each other and cannot function well without another one. Without the cash markets, there is no way to transact the bulk of physical commodities and futures markets lack the basis for their existence. If there are no futures markets, some problems of cash transactions are difficult to solve and the commodity market is immature and imperfect.

Historically, the development of any commodity market has usually experienced five distinct stages: gift-giving, barter, cash (or spot) market, forward (or contract) market, and futures markets. Only the third stage - the cash market - is usually considered the real beginning of organized commodity markets. The futures markets are extensions of cash markets. They evolved out of existing market forces, and their purpose is to make cash markets work better. Thus, a futures market in a given commodity is only an advanced stage of a natural evolutionary process. This kind of relationship between both implies that the market system is not mature in terms of market organization and institutions without both in place. In order to perfect a socialist market economic system, not only well developed cash markets but also the establishment and development of futures markets are required.

### *Economic Functions of Futures Markets in Grain Distribution*

Futures markets of grain can perform some particular economic functions which are needed in the reform of grain marketing and production in China. These functions are primarily the following:

#### *Reduction of Price Fluctuations*

Futures markets could reduce the fluctuation of cash commodity prices through hedging. In the U.S., some experts studied the relationship between price variability of agricultural products and futures trading and found that vigorous futures trading helped to reduce price fluctuation between seasons and years. Working (1960) argued that futures trading correlated with the dramatic reduction of average seasonal price fluctuations. Tomek (1971) analyzed wheat trading data from 1841-1921 and found that price fluctuation was significantly reduced after future trading was introduced, based on the data covering the period before and after future trading began. The same results were found in the onion and cattle markets (Gray, 1963; Johnson, 1977; Taylor and Leuthold, 1974). In addition, futures markets diminished the underlying level of instability. While instability is attractive to speculators, the activities of speculators will serve to reduce volatility. Many studies have pointed out that speculators had every incentive to sell high and buy low and hence to reduce the fluctuation of price. It is reasonable to expect the futures markets for grain would likewise help to diminish the fluctuation of grain prices and the cobweb effect recently happened in China.

### *Shifting Price Risks*

Futures markets characteristically thrive upon uncertainty. Indeed, the volatility of price is one of the first features of a commodity market that suggests the possibility of successful futures trading. Since the futures markets allow hedging to take place, they permit much of the uncertainty to disappear. In fact, hedging provides the facility to lock in a target price and so provides the mechanism for price protection. Using futures markets for price protection is the essential purpose of futures trading (see Appendix B for hedging examples).

The grain industry in the U.S. regards continual hedging protection as a commercial necessity. Indeed, this allowed investment and subsequent expansion to take place in the American grain industry on a large scale.

In China, the production and price risks in the grain sector were borne by the central government in the past at the expense of huge subsidies to stabilize the sale price of grains. If the futures markets are introduced, then some of these risks can be borne and absorbed by investors in the futures markets - speculators. This will help other participants to transfer price risks and to substantially reduce state subsidies as the state transfers its bearing risks to the markets.

### *Price Discovery*

Futures trading can reduce price risks and the production swings caused by the price fluctuations. More importantly, a futures market is a market of primary price discovery. The futures price is a "pure price" and hence the key reference price for

producers, consumers and the state. When farmers and buyers such as food enterprises make production decisions, they needed real price information. The price information from the futures markets is a very important resource because change of this price reflects the expected relationship between demand and supply in the future period of time. Thus, by using price information from the futures markets they are better able to make sound production and consumption decisions. The state also requires the futures price as the reference to determine an adequate price support policy. As a result, sound production and consumption decisions by farmers and consumers and better policy by the state could help to stabilize and raise grain production and prevent great swings of grain production over time.

#### *Improving Marketing Disfunctions*

Futures markets only function well in a highly competitive environment. This means that all participants of markets have an equal opportunity to do business and monopolistic behaviour is not allowed in futures trading. The requirement of normalized trading in the futures markets can restrict bureaucratic and monopolistic behaviour and in turn improve the competitive environment. Thus, the establishment of futures markets can help to develop healthy marketing mechanism, normalize marketing behaviour, and eventually improve the performance of the overall grain marketing system in China.

In addition, futures markets help to tie all local markets together into a national one. An integrated national market means that prices in all local markets will tend to move more closely in unison with the national market (Powers, 1982). Futures markets

and three levels of cash markets currently established; that is national and provincial cash wholesale markets and township free markets, can provide an integrated national market network. Price relationships for a large number of locations will become more stable and uniform. This would improve the functions of grain cash markets.

### **Summary**

This chapter provided an analysis of why introducing the grain futures markets in China is necessary. In particular, productivity development and economic reform increased the need to develop a mature market system, in order to allocate resources more efficiently and rationally. While reform in agriculture has achieved great success since 1978, many problems in grain production and distribution occurred as well. These problems were mostly related to the undeveloped grain market system formed under the centralized planned economy in the past.

Futures markets originated under the market economy and were one kind of advanced market form. Since China is promoting the market economy, improving the market system requires not only cash markets, but also futures markets. In addition, some functions grain futures markets can perform in the industrialized countries could solve major problems now occurring in grain production and distribution in China as the grain sector undergoes the transformation from a planned economy to a market system. Therefore, it is necessary to introduce the futures markets into the grain sector in China.

## CHAPTER 3

### THE POSSIBILITY OF CREATING GRAIN FUTURES MARKETS IN CHINA

#### Introduction

The Chinese government intends to attach more importance to market regulation as it promotes economic development. In order to make market regulation work well, the market system needs to be composed of well developed cash markets and the futures markets. The experience of many industrialized countries shows this.

However, some questions frequently arise about China's use and development of futures markets. Firstly, does political ideology allow the development of futures markets in China and can the futures markets exist in the context of a planned economy? Secondly, is the current economic environment under the reforms adequate for developing the futures markets? Finally, are the external conditions under which grain futures markets might be successful in place at the current stage of economic development. According to W. D. Grossman (1992), These conditions include:

1. efficient cash markets for grain;
2. the existence of market-makers, or speculators;
3. a national "Law on Futures Markets and Futures Trading", along with adequate exchange rules and accounting standards;
4. the development of an efficient money transfer and trade matching system;

5. the availability of sufficient telecommunications and price quotation services;
6. the adequacy of the infrastructure, for example, the transportation and storage of grain.

In the following sections, these issues will be analyzed in detail.

### **Establishment of the Socialist Economic Theory of Markets**

For a long time, because of ideological reasons, the debates on developing capitalism or socialism have existed in the overall process of economic reforms. According to Maoist thought, the market economy is equivalent to capitalism. In this context, futures trading, generated under the market economy, has to be banned.

However, the socialist market economic theory presented in the 14th Party Congress in October 1992 emphasized the important role of market economies in the economic development. "The market economy is not just necessary for the capitalist. The socialist also needs market economies" (Beijing Review, March 30-April 5, 1992). The Chinese government now pays increasing attention to the development of the perfect market system. In both the Eighth Five-Year plan and the Ten-Year Program for Economic Development that were approved by the National People's Congress in April, 1990, there were specific recommendations to develop wholesale and futures grain markets in China. Thus, the ideological question of developing a market economy has been fundamentally solved. The establishment of socialist economic theory of markets has provided a theoretical foundation for the development of the futures markets.

Some practical activities have followed. The Shanghai Academy of Social Science established the Shanghai Futures and Options Trading Study Centre on August 12, 1991. This was the first official institution in China devoted exclusively to academic research on futures and options. More importantly, some futures exchanges of commodities and even financial instruments began to appear. Among them, Shanghai Metal Exchange (SME), China's first national futures market, opened officially on May 28, 1992, and it marked a substantive breakthrough in the nation's economic reform and development of futures markets. SME served as a confirmation that the development of futures trading was possible in the socialist market economy. Recently, the Shanghai Coal Exchange, also the first coal futures markets internationally, was established in Shanghai. At the same time, foreign currency futures and bond futures were also traded in Shanghai Foreign Currency Swap Centre and Stock Exchange, respectively.

In modern society, a pure planned economy or a pure free market economy do not exist. Even in the most strictly planned economy, price signals must also reflect scarcity in the economy. And so-called free market economies inevitably impose their own restrictions. In the U.S., for instance, agricultural price support programs and taxes are all forms of government planning. In addition, in the U.S., the futures industry operates under government imposed price limits and speculative position limits. In other industrialized countries, similar interventions and restrictions are imposed. Thus, it is not necessary that there must be a pure free market for futures markets to have utility, although the greater the extent of free-market prices, the more useful futures markets will be.

Furthermore, no matter whether the planned or free market economy is dominant, the possibility of establishing futures markets exists whenever there is price risk. In China, after the price reform of grains, there was a price risk for more than 60 million tons of grains that were sold at negotiated or free market prices every year. As a result, the need for transferring price risk for producers and consumers clearly exists in China today.

### **Improved Economic Environment for Futures Markets Created under Reform**

There are signs that the Chinese economy is becoming more competitive and efficient. According to Perkins, a Harvard economist, four conditions must be met for a market system to work well in reforming a centrally planned economy. " They are:

1. Goods must be made available through the market rather than through administrative allocation.
2. Prices must reflect long-run relative scarcities rather than the dictates of the plan.
3. Competition must exist; no monopolists, otherwise no productivity gains.
4. Managers must behave according to the rules of the market, rather than those of the state bureaucracy ".

" The Economists Journal " (1992) made a detailed survey of China with reference to these conditions with the following results. " First, ever fewer goods are flowing through the hands of the planners. In 1978 about 700 kinds of producers goods were allocated by the plan; by 1992 the number was below 20. Second, prices are coming

closer to reflecting true scarcities. Currently, market pricing is spreading. In 1992, the prices of 75% of raw materials and 85% of agricultural commodities were market-set. Moreover, since mid-1991 the government has taken advantage of a period of price stability to raise state prices like those for grain and coal much closer to market levels. Third, competition has spread through the economy from many sources. One source is foreign trade and investment. A bigger source is the interprovincial rivalry released by the decentralisation of economic power. The biggest spur of all to competition, however, has been the luxuriant growth of industries, mainly in the countryside, so-called 'collectives enterprises' which are not owned by the central government but are not exactly private either. These 'collectives' have spread throughout China, competing vigorously with each other and with the state firms too ".

In fact, recent developments are even faster. Private enterprises increased rapidly during recent years and began to compete with "collective" enterprises and the state departments as well. The price of agricultural commodities has almost completely opened up. In 65% of counties and cities throughout the country grain prices completely opened up by the April 1993. In the grain sector in Shanghai, for example, the private merchants, collectives and the state grain stores began to vigorously compete with each other for business (The People's Daily, April 20, 1993). At present, in the process of reforming state-owned enterprises, governments eliminated unnecessary intervention in their affairs and encouraged them to compete in the markets. In this way, they gradually became independent commodity producers and dealers and took responsibility for their own profits or losses and for their own decisions about production and marketing. All these

show that the Chinese economy is developing toward the direction of more competitive and efficient marketing system. A competitive marketing environment will provide favourable conditions for the development of grain futures markets in China.

### **The Improvement of outside Conditions for Futures Markets**

In China, it is apparent that further attention should be devoted to the conditions set out previously to increase the prospects for establishing successful futures markets for grain. Well-developed cash markets of grain are considered most important. Sufficient underlying supplies of grain will provide the physical foundations for developing grain futures trading.

### ***The Development of Cash Markets for Grain in China***

The Development and performance of grain cash markets in China were hindered by the state purchasing and agricultural marketing policies. Before 1978, the state department was the only legal grain marketing institution. All private grain marketing was illegal, so the grain cash market was not allowed to exist.

Since the economic reforms initiated in 1978, the cash markets for grain have been formally reopened. As the state procurement policy changed and the relative quantity of quota gradually decreased, the importance of the cash markets has been increasing quickly. Currently, the grain cash markets are developing toward direct competitiveness, efficiency, viability, and are entering a period of rapid development. This has taken the following aspects:

1. the number of the free markets which can trade cash grain has quickly increased;
2. the amount of grain traded on the cash markets has rapidly increased as well;
3. competitive pricing on the cash markets rather than the state planned pricing played an increasing role in the grain distribution;
4. three levels of the cash market system for grain throughout the country were formed and there even appeared forward markets on which forward contracts were actively transacted; and
5. participants on the cash market became diverse, rather than just producers and the state.

#### *The Increased Number of Free Markets*

Although grain cash markets appeared in the early period 1900s and continued to exist before liberation in 1949, they were not allowed to survive during the Maoist era. However, since 1978, reforms in agricultural planning and pricing generally reduced direct intervention in the grain sector. The government increasingly relied on prices, incentives and markets to guide the grain production. As a result, the number of free markets which can trade grain was quickly increased (Table 3.1). From Table 3.1, it can be seen that the number of free markets has more than doubled from 33,302 in 1978, to 61,337 in 1985, and to 72,579 in 1990. After the 1983 decision to encourage further market liberalization, there was a period of especially rapid growth. In the recent years, the cash wholesale grain markets also appeared and developed fast and are now well

Table 3.1 The Growth of Free Markets (1,000), from 1978 to 1988.

Item	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
(1) Urban	0	2.2	2.9	3.3	3.6	4.5	6.1	8.0	9.7	10.9	12.2
(2) Rural	33.3	36.8	37.9	40.0	41.2	43.5	50.4	53.3	57.9	58.8	59.2
2. Value of Trade (yuan 100 m.)	125.0	183.0	235.0	287.0	333.1	385.8	470.6	705.0	906.5	1157.9	1621.3
a. Urban	N.A.	12.0	24.0	34.0	45.2	55.9	80.3	181.0	244.4	347.1	545.3
b. Rural of which	125.0	171.0	211.0	253.0	287.9	329.9	390.3	524.0	662.1	810.8	1076.0
Grain	N.A.	23.9	27.7	28.5	31.3	33.9	34.3	34.7	71.2	84.7	108.1
edible oils	N.A.	4.7	6.7	7.9	8.1	9.5	11.4	14.9	N.A.	N.A.	N.A.
Meat, poultry and eggs	21.2	33.3	42.1	50.9	57.6	72.9	91.8	140.1	246.8	320.3	460.0
Aquatic products	5.2	6.6	9.3	12.1	14.8	18.8	24.1	33.2	64.4	85.4	123.0
Vegetables	14.3	17.1	21.5	25.5	27.2	33.1	38.3	48.8	96.9	131.1	193.0
Dried and fresh fruits	4.0	6.0	7.5	8.8	10.3	13.3	18.6	25.5	59.3	83.1	122.9
Fodder and farm tools	10.4	11.5	7.1	8.4	10.5	11.7	13.1	13.9	15.2	15.8	18.3
Large animals	20.9	29.8	26.5	38.9	45.4	41.4	35.6	32.6	31.1	32.6	38.2
Small animals	N.A.	18.2	29.7	33.3	36.5	36.6	38.6	48.5	51.0	55.8	84.0
<b>Industry products</b>	0.8	1.8	4.9	7.95	12.3	21.0	32.4	53.4	168.0	228.0	291.0

Notes: N.A. = not available

Sources: *Zhongguo nongcun jingji tongji daquan (1949-86) (Chinese Rural Economic Statistical Handbook, 1986)* (Beijing: Nongye chubanshe, 1986); *Zhongguo shangye huaijing tongji zhiliao, 1989 (Chinese Statistical Material of Commercial and Foreign Trading Economy, 1989)* (Beijing: Statistical Publishing House, 1989); *Zhongguo tongji nianjian, 1991 (China Statistical Yearbook, 1991)* (Beijing: Statistical Publishing House, 1991).

organized. So far, there are 14 wholesale cash grain markets at national and provincial level throughout the country.

### *Rapid Increases in the Amount of Grain Traded on Cash Markets*

With the increase of grain production and the decontrolled state policy of purchasing and pricing since 1978, the amount of grain circulating outside the state system dramatically increased and thus more and more grain flowed into the cash markets. Although there are no available data on the total quantity of grain traded in these markets, it is known that the value of sales to nonrural residents accounted for about 70 percent of the total amount of grain and edible oils traded privately. Therefore, the total quantity of transactions, including those among rural residents, was likely 6-7 mmt every year during the 1983-1985 period. In 1986, the total quantity of grain traded in the free market was about 10 mmt (Carter and Zhong, 1989).

In addition, some government departments such as "grain and edible oil negotiated trading companies", which are owned by each province, city, or county, are now participating in the free market to engage in "negotiated" purchase and sales, especially interregional shipments outside the central plan. They now also buy grain in the local free markets for shipment to other regions, or do the reverse. In fact, they are now major players in the local free markets as well as in long distance transport. If these transactions are added to the state purchasing system, then the marketing grain by the state exhibits an increasing trend (Table 3.2). But, if these transactions are added to the cash markets,

Table 3.2 Marketed Grain and Grain Resold to Rural Area<sup>a</sup> (million metric tons of original grain), from 1977 to 1987.

Year	Total Output of Grain	Marketed Grain <sup>b</sup>	Marketed Grain as a % of Total Output	Grain Resold to Rural Area <sup>c</sup>	Grain Resold to Rural Area as a % of Total Output
1977	282.725	56.150	20.0	19.055	6.7
1978	304.765	61.740	20.3	19.030	6.2
1979	332.115	71.985	21.7	20.285	6.1
1980	320.555	72.995	22.8	25.025	7.8
1981	325.020	78.505	24.2	29.730	9.1
1982	354.500	91.860	25.9	32.750	9.2
1983	387.275	119.855	30.9	34.585	8.9
1984	407.305	141.690	34.8	47.085	11.6
1985	379.108	115.640	30.5	57.320	15.1
1986	391.512	134.600	34.4	34.493	8.8
1987	402.980	141.150	35.0	31.220	7.7

Notes: <sup>a</sup> Data are for the production year (April through March).

<sup>b</sup> Includes purchases by state commercial departments, supply and marketing cooperatives and sales through the market.

<sup>c</sup> Figures based on calculation.

Sources: State Statistical Bureau, *Zhongguo tongji nianjian, 1988* (China Statistical Yearbook, 1988); *Zhongguo tongji nianjian, 1991* (China Statistical Yearbook, 1991) (Beijing: Statistical Publishing House, 1991).

commercial grain circulating outside the state purchase system reached 70 mmt by 1990 (Beijing Review, July 9-15, 1990). This has provided sufficient physical foundations for the development of a well-functioned cash markets system.

### *Gradual Transfer from Planned Pricing to Competitive Pricing*

A large amount of grain flowing into the cash markets in recent years stimulated the improvement of the mechanism of competitive pricing on the cash market where prices are established by direct negotiation between buyers and sellers. Currently, on the township cash markets the price of particular grain traded is decided through face-to-face negotiation between grain producers and buyers such as the state grain departments, individual traders, livestock producers and processors and is determined under almost pure competition. Once a deal is made, payment and delivery will follow.

In the wholesale grain markets, collective transactions formed the competitive prices of grain. In addition, the wholesale market also allows direct price negotiation between buyers and sellers, with the requirement that the terms of all contracts executed through direct negotiations be reported to the market. The competitive price formed on the Zhengzhou market has become the reference price for farmers' production decisions and for marketing in many provinces, and for the state's macro-plan for grain production as well.

### *Three Levels of the Grain Cash Marketing System*

The expansion of the role of market adjustment in the distribution of grains quickly generated strong economic pressure for the creation of a wholesale trade structure. Specialized production of grain by households and regions forced the cash markets to expand beyond small-scale trade for local consumption. The increasing amount of grain circulating outside the state system required the services of wholesale merchants and transporters. These, in turn, need specialized wholesale market sites with proper facilities. Under these circumstances, some traditional grain markets trading rice, wheat, corn and other crops provided the basis on which several wholesale grain markets on the provincial and regional level were established.

Currently, a three level of cash grain market throughout the country is being formed. These include two national grain wholesale markets (one in Zhengzhou and another in Shanghai), twelve regional grain wholesale markets and tens of thousands of township free markets (The People's Daily, February 23, 1993). The state tried to integrate these three levels of cash markets into one complete cash market network so as to raise the efficiency of grain marketing during the period of transition from a planned economy to a market economy and to gradually eliminate the administrative barriers between provinces or between surplus and deficit areas. Thus, the cash marketing system would improve the performance of grain marketing since the price can reflect the relationship between demand and supply and regional price differences due to transportation and handling costs.

### *Rapid Expansion of Market Participants in Cash Grain Markets*

At the initial stage of reform, transactions of surplus grain in cash markets was mainly restricted to exchange between farmers or between farmers and the state units. In 1982, long-distance trading by private traders was accepted as legal, and subsequently by 1983 the role of private commerce had been given positive encouragement in that private merchants may be allowed to take their goods into wholesale stations. The government made ideological adjustments and began to change institutions and regulations in order to accept the existence of private grain merchants so long as their activities do not interfere with the state procurement plan. So the number of private grain merchants (mainly farmers) rapidly increased. Currently, participants in the grain cash market include not only state and provincial grain and commercial departments but also private traders, collective grain producers, grain processors, food industries, and livestock producers. All these are improving the competitive environment and efficiency of grain cash markets. Multiple participants, especially private grain merchants who now actively trade and even vigorously compete with the state and collective enterprises, can generate competitive pricing and are very important for the smooth functioning of the grain cash market network.

As the role of the cash markets expanded in the distribution of grain, the price of grain on the cash markets began to become more volatile over time, especially in the township free market. Price variability over time (season or year) was the basic characteristic of the cash market in which demand and supply and other factors

determined the price. This variability could not be overcome by the cash market itself despite latter developing to an advanced level.

Accordingly, sizable, relatively efficient, and price volatile cash markets in grain sector seem to be appearing. As the three levels of cash markets in the grain sector improved and became established and the fixed price part of the "two-track" pricing system was gradually reduced, well-developed cash markets of grain are quickly becoming reality.

### *Improvement of Infrastructure and Communication Conditions*

Although the transportation and storage infrastructure in China was not well developed, it already bore the function of circulating the cash grain throughout the country without the futures markets. With the introduction of the futures markets, the conditions of storage and transportation for grain, especially from the delivery point of view, should be improved more in order to assure the requirements of physical delivery. But they do not need to be increased significantly under current conditions. In addition, communication facilities and capacity, though still underdeveloped, have been greatly improved during the recent years. In the following section, general infrastructure conditions and communications in China will be briefly analyzed.

### *Transportation*

The main forms of grain transportation in China are railways, waterways and roads. So far the railways have been the most important means of transport in China,

especially for long distance carriage of large and bulky grain. In 1949, there were only 21,800 km of railway lines open to traffic in China, but by 1985 this total had risen to 52,100 km and reached 53,400 km in 1990 (see Appendix A Table A.2). Currently, construction of over 10,000 km of new lines is under way across the country. Railway transport is now available to every provincial and autonomous region capital except for Lhasa in Tibet. Most of the railway lines run in the east of the country. By coincidence, the main grain production and consumption areas are also located in the east of the country. The railway lines reach the central city of almost all grain production and consumption areas. The importance of the railways in China was unquestionable because they provided the only economic and practical means of long distance transport of bulk grain within the country. In fact, railway did play a substantial role in the distribution and redistribution of grain between surplus and deficit areas and the fulfilment of long-distance delivery requirements. For example, a World Bank report (1985) estimated that interprovincial grain transfers were about 22 mmt in 1982. Of this, 17 mmt were shipped by railway. In 1990, this figure reached 54.3 mmt of grain. Average distance of transporting grain was 1041 km. However, it was usually considered that the railway transportation constraint was the "bottleneck" with interprovincial grain shipments. According to Carter and Zhong (1989), this is not necessarily the case. Grain shipments only accounted for less than 1 percent in 1978 and 1.5 percent in 1982 in the total railway freight volume. The increase in freight volume, between 1978 and 1982, was at least four times as large as the increase required for grain transfer. Therefore, if grain transportation

had been given high priority, railway transportation might not have been a serious constraint.

Waterways are another important transportation means for grains. There were more than 109,200 km of navigable inland waterways in China in 1990, most of which ran through the eastern part of southern China, with the Yangtze River and its tributaries forming the most important water lanes. As in the U.S., water transport in China dominated wherever there was a navigable water course, because it was unparalleled in its economy of operation. This was especially true in southern regions of the Yangtze River (major rice production areas) where water transport was dominant and a network linked all the waterways leading to most of the important cities in the regions. Thus, the bulk of grain was transported through waterways wherever it was available. But, when the whole country was considered, inland water transport was not adequate for a nationwide transport system, as China's waterways only led to localized regions in southern China. Therefore, to fulfil grain delivery on time domestically, water transport must be organically connected with other transportation means.

For vast regions of the country highways unquestionably provided the main means of transport for grain. In the last 30 years there has been rapid growth in road construction and an ever-increasing length of roads opened to traffic. The roads available for haulage exceeded 1,028,300 km in 1990. Roads linked 90 percent of the main towns and 70 percent of the small towns through the country in 1986. Although the number of trucks in China rapidly increased from 1,000,170 in 1978 to 2,230,000 in 1985 (of which only 425,500 were agricultural vehicles) and to 3,684,800 in 1990, the absolute number

for agricultural uses was too small to meet the demand. However, highway transportation is still a potential means of transporting more grain in the future. Storage and transport companies in different regions have a number of trucks for transporting grains. These kinds of companies reached more than 4,000 in 1987.

To see the relative importance of these three transport means, in 1985 for instance, the total freight volume of grain was 107.9 million tons, of which 45 million tons was transported by train, 37.9 million tons by truck, and 24.9 million tons by water transport. These figures suggest transportation for the physical delivery of grain might not be a serious barrier for grain futures trading in China if grain transportation is given a higher priority.

### *Storage*

Grain is harvested during a relatively short period of time but is consumed at an approximately uniform rate throughout the year. It is storage that makes grain available at the desired time. Storage is the market function that matches production patterns with consumption patterns over time. Storage facilities are located at all stages in the grains distribution complex: on farms; at local, provincial and central granaries; and at milling and processing plants.

In the U.S., from 1960-1981 about half the grain stored was on-farm grain stocks and the other half was put in off-farm grain storage facility (Cramer and Walter, 1983). Government programs played a significant role in the steady expansion of storage

capacity, especially at the farm level. The closer that storage was to the point of production, the greater was the flexibility in making final market choices.

In China, good harvests in the early 1980s had put great pressure on the old and backward storage installations. The state storage system was not prepared to handle the huge increases in grain sales. Its existing facilities were soon overwhelmed as the amount of grain production increased. Until 1983 the national storage ratio was 1.78 units of storage capacity for one unit of procured grain. By 1983 the capacity dropped to only 0.7 units of capacity for every unit of procured grain. The country still has more than 45 billion kg of grains stacked in open air. The main reason for such grain storage conditions is simply a lack of investment by the central and provincial government. From 1949 to 1989, China only invested 7.4 billion yuan for new granaries, really very low compared to investment in other fields of capital construction (China Daily, March 12, 1992).

In fact, if grain marketing had been a profitable business, the problem with storage would not be difficult to solve. Since extra procurement in the surplus regions would only lead to a larger budget deficit, the local grain purchasing departments were reluctant to buy too much grain. More importantly, building new grain storage would require local funds from either the provincial or county governments. So a local government, in a surplus area, preferred not to spend its revenue on the grain storage which are used for the benefit of another province.

However, from January 1993 on, the central government is not in charge of unifying purchase and sale policies and let both surplus and deficit provinces solve their grain annual balance through the direct negotiation of contracts between them. This

change limits the obligation of surplus province to export grain at the procurement price. Therefore, further transactions are made in the cash markets. The governments in surplus provinces are more willing to buy and ship extra grain to deficit areas. This new policy is expected to help solve the problems associated with interprovincial grain transfers, improve production incentives, and encourage building more storage facilities to hold more grain for sale in the surplus areas.

In addition, the central government has also paid increasing attention to this issue and established a system of "special grain reserves" in the summer of 1990, with new warehouses which can hold almost 18 mmt of grain. Since 1983, the volume of new grain storage capacity has reached 28.70 million tons. For futures trading requirements, exchanges can choose the delivery locations (and traders) that have sufficient storage facilities and assets. Thus, storage should not become a restrictive factor for grain futures trading in China.

### *Communication*

Efficient communication is crucial to the operation of a futures market. Telephones are necessary to connect the floor members and their company's headquarters as well as direct lines to large or frequently trading clients. Communication also supports the web of price reporting with computer terminals linking the activity in the futures markets with trading offices, various news agencies and service centres.

In China, in 1990 long distance telephone services were available to 97.6 percent of the townships and towns in the countryside (see Appendix A Table A.3). In the

provinces along the coast in the eastern part of China and in the prosperous suburbs of the large cities, home telephones were no longer unusual in Chinese families. In Tangshan Township, Huantai County, Shandong Province, for example, some 50 percent of all households have installed program controlled telephones by the end of 1992. The farmers there usually do business by telephone with both domestic and foreign customers. Across the country there is now an average of 1.63 telephones for every 100 people. The provincial cities usually have more than 10 percent. In Beijing, this figure has reached 18 percent (The People's Daily, January 13, 1993). By the end of this century, it is officially estimated that total telephones across the country may reach 100 million and there will be an average of 5 and 6 percent throughout the country. Provincial and coastal cities and economically developed regions may reach an average of one telephone for every family.

At present, up to 37 percent of urban telephones are owned by individual households. By the end of 1992, 876 cities and counties were able to make direct international calls, while 1,476 cities and counties had access to the domestic direct-dialling network (Beijing Review, March 1-7, 1993).

In addition, other communication facilities such as paging systems and mobile telephone systems were expanded in recent years. Fax service is also available in the large cities now. Recently, a national information network system covering the whole country - National Agricultural and Sideline Product Information Network (NASPIN) - became formally operational. This system receives and collects information about production trends of agricultural and sideline products in various regions, price movements, state of demand and supply, imports and exports of agricultural and sideline production in

different provinces, cities and counties, and even trading state of various specialized companies, large wholesale cash markets and rural and urban free markets daily through a modern computer information and communication network. It can exchange information with the information centres of different ministries and news agencies through computerized sorting, aggregating and depositing information for network members to look for, and use. This network centre provided services 24 hours daily and had more than 200 direct members and 1,000 indirect members who networked with semi-centre. Both buyers and sellers can make business transactions through computer in a convenient way for cash and even futures trading (The People's Daily, January 12, 1993).

### ***Commercialized Development of Financial Markets***

Banks and credit play a very important role in the futures trading of commodities. Banks can directly provide services for the futures trading through a clearinghouse composed of member banks. In the British, for example, International Commodities Clearing House Ltd (ICCHL), which provided clearing facilities and services for the majority of the domestic futures markets and for foreign countries and regions, consisted of the five major UK clearing banks and a merchant bank. In addition, banks and trust agencies usually preferred to provide credits for hedgers and monitored the financial situation of customers who participated in futures trading.

The profit or loss shown by the balance of existing contracts every day in the futures trading is reconciled with the corresponding trader (usually clearinghouse members) through the margin system. Because different traders might have their

businesses with different banks, money transfers between banks must be convenient and quick on a daily basis in order to conclude deals in time. Accordingly, banks and their services play very important role in future trading. Currently, reform of the financial system of a central bank coordinated with different specialized banks in China is under way. The central bank will conduct indirect control over specialized banks and non-banking financial institutions instead of handling the concrete business of making loans.

The Communication Bank, the first commercial bank in China, is the share-holding bank which now tries to implement proportional management of assets and liabilities, in an attempt to completely transform into a competitive commercial bank. Specialized banks began to actively explore ways to control loans granted for policy considerations as well as commercial loans, conduct management of separate accounts in separate financial institutions (Beijing Review, March 8-14, 1993). As inter-bank money markets and foreign exchange markets were developed, money transfer between banks would be more convenient and quick.

At present, various commercial banks sponsored by local governments and even large corporations have begun to appear and are developing very fast. By the end of 1992, total assets of commercial banks in China reached 210 billion yuan and these became very important components of Chinese banking system (Beijing Review, January 4-10, 1993). These commercial banks borrowed the experience of advanced management modes of international commercial banks and practiced self-administrated, self-borne profits and losses, self-balanced, self-restricted and self-developed. They were really self-managed

and self-constrained money administrated enterprises and took short-term credits and commercialized financial business as main services.

Recently, foreign banks were allowed to open up branches in some major cities within China territories. The increased capacity of commercial banks, even specialized banks which can make commercial loans provides a potential source of credit for hedging, even for speculation. These recent reforms provide a favourable condition for the development of futures trading. In fact, some banks in China are already involved in future trading. Shanghai Metal Exchange depends on the clearing divisions of two banks, the Industrial and Commercial Bank and the Communication Bank, to clear accounts. Although this practice did not meet the requirements of futures trading as well as fit into the international tradition, the experience of banks involved in the futures trading can be used to stimulate further improvement of the banking and trust businesses.

### ***Currency Convertibility and Returning to GATT***

The development of the futures markets of grain in China would be eventually integrated into the international market. Viewed from the experience of the other countries, the traders from other countries usually participated in the futures markets. To accommodate this, currency must be freely exchanged. The internationalization of the futures industry in China requires the free convertibility of RMB. So, hedgers and traders outside China who wish to use the domestic market will require the ability to remit fund for margin payments and repatriate any gains on a daily basis. If funds are idle in the process of converting from one currency to another, or if the bid-ask spreads for foreign

exchange transactions are too wide, the costs of trading on futures markets in China will become prohibitive for international consumers. Fortunately, a major step toward free convertibility of the RMB is being made in Shanghai, at the Shanghai Foreign Exchange Transaction Centre (SFETC), the largest foreign currency swap centre in China. It is possible to develop close cooperation between the SFETC and the grain futures markets in Shanghai during the transition period as each continues to grow and flourish.

In addition, China has been gradually reducing the official RMB exchange rate to reflect the central government's attempt to narrow the gap between the official rate and the rate at foreign exchange centres, or the market rate (see Appendix A Table A.4). From April 9, 1991 to December 8, 1992, for example, the RMB has been devalued by some 11 percent (Beijing Review, December 21-27, 1992). It seems possible to make the RMB convertible through unifying the present double exchange rate system in the near future, especially with China's return to GATT in sight.

In fact, in order to resume its status as a contracting party to GATT, China has made significant progress in the reform of the foreign trade system. Since 1991, China's general tariff level was reduced by 7.3 %, and at the same time the import readjusting tax was cancelled and foreign currency controls were relaxed. These reforms greatly promoted the development of foreign trading in China and many Chinese enterprises have entered international markets. Meanwhile, these enterprises have to face more risks with international competition. For them to develop domestic futures trading and to participate in the international futures markets would be an alternative solution to transfer risk associated with unexpected commodity price fluctuations. In short, the reform of foreign

trade system and the progress of China to re-enter the GATT would push the development of the futures markets.

### *Effect of Operating the Zhengzhou Grain Wholesale Market and Exchanges of Other Commodities*

Although Zhengzhou market was the grain cash wholesale market, it was originally designed for futures trading. Some elements needed in futures trading were introduced in the Zhengzhou market. Thus, the performance of Zhengzhou market should have gained some valuable experience since it opened two years ago.

Zhengzhou Grain Wholesale Market was established in October 12, 1990 and was mainly involved in trading cash grains. Transacted contracts which included variety, quantity, quality, price, date of delivery, location of delivery and acceptance, method of delivery, and means of payment needed to be negotiated and signed by both buyer and seller in the market. The contract was a normalized one approved by an agency authority rather than a standardized one. Contracts were divided into two categories, that is, cash contracts which were delivered within two months and forward contracts for more than three months. A contract can also be transferred before delivery if one side of contract met some difficulties in fulfilling the contract.

According to Williams (1982), occurrence of this forward contract on the cash market set the stage for the development of futures trading. Since the forward contract from design to delivery needed to undergo a long period of time during which market prices continuously fluctuated, both buyer and seller had to bear price risks and traders

hoped to freely liquidate the signed contract if the situation was unfavourable for them. As long as the forward contract can be transferred, the forward contract becomes a futures contract which is a standardized one and can be freely transferred before delivery. Thereby, forward trading had a critical role in the development of futures markets.

Zhengzhou market now intends to develop the active forward contract by encouraging and helping contract transfers before delivery. Suitable standardized contracts could be designed in the near future in order to increase the liquidity of contracts.

In addition, some exchanges of other commodities are providing experience for the establishment of grain futures markets. During recent years, the Shanghai Metal Exchange was gradually extending its service from the wholesale trading to the futures trading. In this process, one of the most important steps is to design standardized contracts. In fact, basic trading standards emerge in the natural course of commerce. For example, if it is convenient to transport certain volumes or weight of a commodity, those volumes or weights tend to become standards. Similarly, if specific commodity grades have wider commercial applications than others, those grades would tend to become standards. SME is considering the standardized contract, based on just this principle. Thus, national wholesale grain markets in China could select some species of a particular grain to design standardized contracts, based on actively traded forward contracts. It is possible that the grain futures markets could be formally operational soon since the Zhengzhou and Shanghai national grain wholesale markets all strive toward this end.

## Summary

In this chapter, some outside conditions required to establish grain futures markets in China were analysed. It was found that political ideology should not be an obstacle to develop the grain futures markets. Most economic conditions analysed in the chapter were found to be adequate to developing grain futures markets. Particularly, sizable, competitive, and price volatile grain cash markets are being formed throughout the country as the three level system of grain cash markets is being established. In addition, communication and price quotation services are being rapidly developed and could satisfy the requirements of grain futures markets. Transportation and storage, while undeveloped when the whole country is considered, could be sufficient to develop the grain futures markets if the transportation for grain futures delivery is given priority and appropriate delivery locations and traders are chosen. Recently, rapid reforms in the bank and credit system are under way. Efficient money transfer and standard accounting are being developed. RMB inconvertibility, though not completely solved in the short term, should not be a major problem to futures trading because of the existing double exchange rates. However, so far, there is no law governing futures markets and an associated administrative agency. Speculative activities, while permitted, still do not play a great role in the futures trading of other commodities in China. These two issues, because of their particular importance, will be further analysed in the next chapter.

This analysis suggests that the fundamental conditions required for grain futures markets could be satisfied although individual conditions still need to be improved.

## CHAPTER 4

### PRIMARY ANALYSES ON CREATING GRAIN FUTURES MARKETS WITH CHINESE CHARACTERISTICS

#### **Introduction**

The futures markets were originally created under the privatized economies of the Western countries. Currently, the most thriving futures markets in the world were established on the foundation of the privatized and free market economy. The internationalization and normalization of futures trading were also formed on the same basis. China might be the first country with a public ownership system to develop the futures markets internationally. Therefore, the futures markets of grain in China is expected to have specific attributes because of the particular social forms and the status of China's economic development and structure. Consequently, the establishment of grain futures markets in China has to consider not only international standards and practices of futures trading, but also unique character of China. Chinese characteristics would be embodied in the following main aspects:

1. forms of public ownerships;
2. the transition period from a planned economy to a market economy;
3. China's status as a major net importer rather than exporter of grain; and
4. a different starting point from the industrialized countries.

First, China is a socialist country which has a public ownership system. Thus, grain futures trading will be operated in the context of the socialist system and, at least initially, major participants in futures trading will be various kinds of public enterprises. Private participants will be limited to a certain extent because of the current low income status of majority residents and policy restrictions on private speculative activities. This issue will be analyzed in detail in the last section.

Second, the grain distribution system in China now is in a transition period from the traditional unified purchasing system to the market system. Recently, the state abandoned the planned rationing system and transferred it to direct transactions of grain between the producing and consuming regions. Production and consumption regions had to take full responsibility for their respective requirements. The grain departments of different local governments needed to avoid price risks in the market. On the other hand, most enterprises such as grain departments at different levels of governments usually had a shortage of liquid assets and thus had difficulty in participating in speculative activities. Residents' income generally only kept them alive and they had too few assets to participate in the futures trading in the short term. In addition, the financial industry in China now finds it almost impossible to lend to private residents and enterprises to engage in speculative business. So the grain futures markets must initially accommodate these characteristics of current economic development in China.

Third, China was one of largest net importers of grain in the world market although some grains are now exported (see Appendix A Table A.5). This situation shows that the total amount of grain supply is not sufficient for the demand within the country.

The annual consumption of grain per capita currently is just 400 kg. Accordingly, the amount of grain available to the market would be relatively limited, especially in the near term. However, almost all other countries which currently have successful grain futures markets such as the U.S., U.K. and Canada were exporters of these grains, and their commercial production of grain was very high.

Finally, the grain futures markets in western countries generally experienced a slow evolution from the cash market to the forward market and then to futures markets. In China, the Zhengzhou market has already introduced some futures elements although it is still the cash wholesale market (Beijing Review, December 9-15, 1991). And the Shanghai Grain and Oil Exchange is now ready to directly introduce futures trading with simultaneous development of forward contracts. Obviously, the starting points for developing the grain futures markets are very different between China and the Western countries.

The establishment of the grain futures markets with Chinese characteristics does not mean that the rules of traditional futures trading can be disregarded. Instead, China should fully absorb the experience of international traditions in the grain futures trading. In fact, implementation of normalization and internationalization is a prerequisite for the development of successful grain futures markets in China. In the following sections, firstly, the basic characteristics of the futures markets in the industrialized countries will be briefly discussed. Secondly, the current situation in the development of grain futures markets in China and some existing problems will be analyzed. In section 3, two scenarios for creating grain futures markets with Chinese characteristics will be suggested.

In the final section, several key issues for developing successful grain futures markets in China will be discussed.

### **Basic Characteristics of Grain Futures Markets in Industrialized Countries**

Although the successful grain futures markets in different countries have their own characteristics, some common elements among them exist. First, there exist a set of well-developed conditions which include the developed cash markets for grain, adequate infrastructure, sufficient communications, efficient banking and money matching systems and a large number of participants. Second, there were highly normalized futures trading systems which included organized and self-regulated exchanges, standardized contract transactions, and a clearinghouse and physical delivery system. Finally, successful contracts of some grains must meet an extensive list of commodity attributes and contract characteristics which have been studied by many researchers. However, developing a successful contract market is also considered to be the consequence of an exquisite balance between science and art.

Futures trading of grain was always conducted on an organized exchange. The exchange was an unincorporated and nonprofit organization that established all the rules of trading, disseminated market information, and provided physical trading facilities. The exchange was composed of members who can trade for their own account or as agents for clients outside the exchange. The members may be speculators who hope to make a profit by exercising their trading skill or hedgers who try to use the futures trading to reduce risks. Most exchanges of grain have a specific number of memberships which can

be sold or bought. The principal source of operating funds for most exchanges came from assessing a fee for each trade. Therefore, the financial health and the survival of the exchange depends on trading volume, contract popularity and services offered. As a result, exchanges of grain grow or die. For example, in the U.S., there were very high trading volumes of wheat futures contracts in several exchanges (see Table 4.1). Therefore, these wheat futures markets can survive.

The futures contract of grain is a type of standardized contract (see Appendix A Table A.6 and Table A.7). The futures contract specifies the commitments, the main terms and conditions of the contract. This kind of highly standardized contract allowed the buyer and seller to make equal and opposite legally binding commitments. This helped to promote liquidity. The specification of the futures contract of particular grain sometimes played very critical role in success or failure of this contract.

Normalized futures trading needs the facility of clearing accounts, that is a clearinghouse. A clearinghouse is typically a nonprofit membership association. Currently, there are two kinds of clearinghouses in terms of organization form. Most North American futures exchanges had their own clearing operation and hence the members of a clearinghouse usually formed a subset of the members of the associated exchange operation. A clearing corporation was also established independently of any particular exchange in order to serve one or more exchanges. The International Commodity Clearing House (ICCH) cleared for most of the futures exchanges in England and also some exchanges in other countries and regions. Currently, the Intermarket Clearing Corporation clears for the New York Futures Exchange and the Philadelphia Board of Trade.

Table 4.1 U.S. Exchanges and Futures Contracts of Grain.

Exchange & Contract	Volume Traded ( in million )					
	1982	1983	1984	1985	1986	1987
Chicago Board of Trade						
Wheat (1865)	4.0	3.9	3.0	2.1	2.1	1.9
Corn (1865)	7.9	11.9	9.1	6.4	6.2	7.3
Oats (1865)	0.4	0.4	0.2	0.1	0.1	0.3
Kansas City Board of Trade						
Wheat (1877)	1.0	0.9	1.0	0.7	0.7	1.0
Minneapolis Grain Exchange						
Wheat (1885)	0.3	0.4	0.3	0.3	0.3	0.3
Mid-America Commodity Exchange						
Wheat (1880)	0.2	0.3	0.4	0.3	0.3	0.2
Corn (1880)	0.3	0.6	0.6	0.5	0.4	0.3

Sources: The U.S. Futures Industry Association.

According to Duffie (1989), one advantage of an independent clearinghouse was to insulate the exchange from the legal liability of the clearing corporations. A clearinghouse supported the financial integrity of a futures market by posting margin and daily resettlement and guaranteed for all contracts.

Although very few futures contracts were delivered upon, it was only the potential for delivery that gives a particular value to the contract and makes successful grain futures trading possible. Each contract states explicitly the delivery location such as a licensed warehouse approved by the exchange. Most grain exchanges have multiple delivery points, and a seller may select among them, although some locations may be at a price discount.

Moreover, the volume of contract delivery varies considerably between exchanges at different countries or between exchanges within the country. London Grain Futures Markets (LGM) had the highest volume of delivery for wheat, taking between 7 and 10 percent of the total contracts. In the U.S., grain exchanges had relatively low volume of delivery; for example, Chicago Board of Trade (CBOT) had only 0.47 percent physical delivery of the total wheat contracts (Table 4.2). Correspondingly, there were as many as 160 futures stores registered with LGM in the U.K in 1980 and then down to 74 with a capacity of 1 million tonnes in 1992 (Duncan, 1992). It was also because of the relative abundance of futures stores that deliveries against futures contracts occurred so often. In U.S., even the CBOT had only a few delivery points for grain along the country to meet the delivery requirement (Chicago and Toledo were the main grain delivery points and Kansas city, Minneapolis and Duluth were wheat delivery points). Regardless of the

Table 4.2 Delivery of Selected Commodities to Satisfy Futures Contracts in the U.S., 1985-1986.

Contract	Volume of Trading <sup>1</sup>	Total Contracts Settled by Delivery or Cash Settlement <sup>2</sup>	Percentage Settled by Delivery
Live Cattle <sup>3</sup> (40,000 lbs.)	4,985,000	3,075	0.06%
Live Hog <sup>3</sup> (30,000 lbs.)	1,886,000	281	0.01%
Wheat <sup>4</sup> (5,000 bu.)	2,190,000	10,365	0.47%
Corn <sup>4</sup> (5,000 bu.)	6,188,000	24,315	0.39%
Soybeans <sup>4</sup> (50,000 bu.)	6,715,000	1,118,135	1.76%
Cotton <sup>5</sup> (50,000 lbs.)	876,000	1,135	0.13%
Orange Juice <sup>5</sup> (15,000 lbs.)	236,000	2,210	0.94%

Sources : Annual Report, 1986 CFTC (Washington: USPO), 1987

<sup>1</sup> Rounded to nearest thousand.

<sup>2</sup> Excludes commodities redelivered against other futures commitments.

<sup>3</sup> Chicago Mercantile Exchange.

<sup>4</sup> Chicago Board of Trade.

<sup>5</sup> New York Cotton Exchange.

absolute volume of delivery, it was important that the delivery spot marketed assets are sufficiently large and liquid, to avoid the potential for manipulation. Therefore, on the one hand, the delivery spots were frequently and strictly monitored by the exchanges in these countries. On the other hand, the available set of delivery options were designed in order to allow the short to choose among the available grades, locations, and delivery time with a price discount so that manipulation was not possible.

This kind of normalized futures trading of grains with self-regulation was usually monitored and administrated by the national commodity futures trading agencies. In this way, futures trading can be integrated into a complete and orderly marketing system. This system has been a very important organizational guarantee for successful futures trading for grain in the western countries.

Except for the requirement of normalized structure of grain futures trading, commodity characteristics of a particular grain itself and its contract characteristics also played very important role in the successful performance of futures trading. Not all grains can have futures contracts that can be successfully traded on the organized exchange. Whether or not individual contracts are successful or fail depends on several factors which have attracted many studies. The literature contains three approaches which focus on "commodity characteristics", "contract characteristics" and "effective cross hedging". These are applied to identify the success of futures trading of various commodities.

A "commodity characteristics" approach defines feasible commodities for futures trading based on an extensive list of required commodity attributes. The following attributes were considered as crucial to qualify a commodity for futures trading: 1)

durability and storability; 2) capability of standardization and grading; 3) homogeneity of products; 4) large supply and demand; 5) uncertain demand and supply and fluctuating price; 6) competitive cash market and low delivery cost; 7) a basic good rather than a manufactured product; and 8) the breakdown of forward contracting (Carlton, 1984).

Many grains fit into this list. However, the question of why contracts of some grains were not successful for futures trading even though they could fulfil the above attributes remains. Accordingly, analysis began to focus on factors endogenous to the futures contract design itself. It was found that imperfect or careless contract specifications which do not attract sufficient hedging and speculative trading interest to the market or prevent manipulation were the main reasons for failed contracts. Working (1954, 1970) argued that the volume of trading in a futures market was determined by the amount of hedging business. Power (1970) and Sandor (1973) found the importance of contract terms favouring merchandising use and attracting commercial users. These studies showed that it was important to successfully attract hedgers with contract specifications that conform to commercial practices. On the other hand, Gray (1961, 1967) emphasized that hedgers depended on speculators to absorb the excess demand or supply of contract, thus a lack of speculation results in higher costs of hedging, in turn causing less hedging and consequent failure of futures trading. Silbar (1981) also provided a few examples in which the modification of a single contract provision to attract speculators brought successful contracts.

In addition, despite attractive contract specifications, hedgers and speculators will not use a market if manipulation cannot be prevented. Gray (1966) listed many examples

of failed or revised contracts in which original provision favoured the buyer or the seller, enabling one side to squeeze the other as the delivery date approached, especially in the case of limited deliverable supplies of the cash commodity. The outcome of squeezing distorted the normal price relationship and generated substantial gains for one side and large losses for the other. Therefore, according to "contract characteristics", the importance to success of contract designs would be to attract hedgers and speculators and prevent manipulation.

Although many grains can satisfy the listed commodity characteristics and its contract specification also reflect the necessary contract characteristics, some such as barley and sorghum still have not developed successful futures trading in the U.S. Both Working (1953) and Gray (1970) attributed the failure of barley futures to the existence of corn futures which provided effective cross hedging at low cost because the corn market is a liquid, close substitute. Likewise, Hieronymus (1977) found that the failure of the sorghum contract was due to adequate risk reduction using the more liquid corn market. Studies that link failure/success with the presence/absence of a low cost, effective, cross hedge are referred to as using the "effective cross hedge" approach (see Black, 1986). This approach implies that if the risk of price fluctuation in one commodity can be reduced substantially by cross hedging in an existing liquid contract market, then hedgers had little incentive to use a new futures contract. As a result, a futures contract market without hedging interest was doomed to fail.

These studies suggest there is no single method or approach that explains what determines successful future trading of particular grain. Therefore, it could be said that

successful futures trading of grain relies not only on the general economic conditions and organizational structure of futures trading, but also on characteristics of the grain itself, its contract attributes, and even its close substitutes.

### **Development of Grain Futures Markets and Major Problems in China**

As mentioned before, China began to develop grain futures trading recently. Zhengzhou Wholesale Grain Market and Shanghai PuDong Grain and Oil Exchange already introduced some futures elements and are ready to engage in futures trading, respectively. Both markets are actively developing forward contracts and encouraging transfers of contract before delivery. However, the experience from the developed countries shows many actions have to be simultaneously undertaken in order to establish normalized futures markets for grain. These include: 1) adequate general economic conditions; 2) establishing normalized futures trading structure; and 3) developing contract specifications of the particular grain to be traded on the futures markets. The first part has been analyzed in detail in a previous chapter.

Second, many unresolved issues regarding a normalized futures trading structure still exist, especially in Zhengzhou. These mainly involve the following:

1. although the membership structure was adopted, member attributes are different from that of individual membership in the West. Property rights of members under public ownership are not clearly defined;
2. a well-developed clearinghouse has to be established;

3. standardized contracts have yet to be carefully designed, based on further development in forward contracts for grain;
4. speculative activities within the exchange are restricted hence not vigorous;
5. unified futures trading law and corresponding national commodity futures trading agencies have not appeared so far; and
6. the physical delivery system has to be carefully designed and constructed in order to meet the requirement of possibly huge deliveries at the initial development stage of grain futures trading.

In the West, exchanges generally allowed only individuals to become member. But these individual members often act on behalf of firms such as brokerage houses, investment banks, or commodity dealers and producers. In China, the majority of members currently are various kinds of the state-run grain companies, food enterprises and other agricultural companies under public ownership. Therefore, for the membership to become a real legal body of trade, the property rights of the members will have to be clearly redefined. This issue will be discussed in detail in the last section.

Clearing arrangements were an important step to provide a trading protection mechanism for customers. Without clearing, the exchanges had no way to assure trading commitment and to transfer price risks. In Shanghai Metal Exchange, clearing business is currently carried out by the clearing divisions of two banks -- Communication Bank and Industrial and Commercial Bank -- neither of which are under the exchange nor are an independent clearing company. Therefore, it does not meet the tradition of the international futures trading industry. At the same time, it was unable to monitor contract

trading daily in the exchange. As shown before, there are two kinds of clearing arrangements elsewhere in the world. Either has to take responsibility not only for clearing trade, but also for risk management and guaranteeing the contract. In the initial stage of the development of futures markets for grain in China, it could be appropriate to establish the clearinghouse under the exchange, especially in Zhengzhou. This will help the exchange to develop unified and integrated management of all futures trading. If, however, the grain futures trading is opened in Shanghai, a separate clearinghouse from the exchange and establishing an independent clearing company to serve various specialized future exchanges in Shanghai and even throughout the country should be considered.

Currently contracts and even forward contracts of grain are being actively transacted in some grain wholesale markets in China. For example, since the Zhengzhou market began business in October 1991 1,600 contracts have been finished by the end of 1992. The forward contracts are being expanded and the transfers and transactions of contracts before maturity are being encouraged. However, because forward contracts are usually signed by both buyer and seller and involved different contents and items between contracts, it is difficult to transact this kind of physical contract before delivery since different traders may have different requirements for contract contents.

The development of futures markets for grain can solve this inflexibility of forward contract transaction before delivery. One significant attribute of the futures markets was its standardization of contracts. Once the contents of contracts become standardized, they become liquid and convenient to transact. However, considering

domination of hedging and high delivery volume at the initial stage of development of grain futures markets in China and bearing in mind the bottlenecks of transportation and storage facilities of grain, designing the standardized contract must deal with these issues. For example, in designing standardized contracts, in principle, the dates and locations of delivery should be clearly specified. But, when physical delivery is eventually executed, futures trading procedures can be followed at first, and then return to cash transactions for contract dispute solution procedures, quality inspections, along with a series of discount and premium mechanisms. Here, one (or several) "standard" variety is deliverable at the futures contract price. "Nonstandard" grades are delivered at the contract price plus or minus an established amount based on whether the nonstandard variety is of better or lesser quality than the standard.

Although the futures markets in different industries began to appear and were even entering a rapid development stage, there did not exist a set of laws suited to different commodities, industries and regions in China. Thus, the operation of all futures markets and the introduction of new contracts were not under the surveillance of the state's unified law and regulations. In fact, without clear specification of law, the grain futures markets cannot function very well and the whole futures markets cannot achieve healthy development. The relationship between the futures markets and law and regulations will be discussed in detail in the last section.

In the traditional context of socialism in China, speculative activities were often considered illegal and were prohibited in the past. As reform moved further, the speculative concept was gradually accepted by general public in China. The government

also began to permit the existence of speculative businesses subject to certain restriction, such as they could only occur within the exchange. But, for ideological reasons, speculative activities, even within the exchange, have not been vigorous so far. For example, in Shanghai Metal Exchange, the majority of participants in the exchange were hedgers who represented the government departments, large companies and enterprises. Very few participants were engaged in speculative business. Even in the process of designing of grain futures exchange by the government, the same ideas about speculations seem to exist. This may be unfavourable for the development of the futures industry in China. In fact, active speculative business within the exchange would help the healthy operation of the futures markets. We will separately analyze this issue in the last section as well.

Although the futures markets for grain (especially wheat) achieved success in the West, the amount of physical delivery required by the futures trading usually was very small. A large number of contracts were liquidated before delivery. However, physical delivery was a necessary component of successful futures trading otherwise hedging would be impossible and the futures markets could not exist. In the grain futures markets in the U.S. and Canada, physical delivery was accommodated by several fixed delivery spots and traders, both of which were specified by the exchange and approved by the Commodity Futures Trading Committee.

Since the Chinese government intends to create the futures markets of grain shortly and at the initial stage of the futures trading of grain hedging will be designed to play a dominant role in the exchange, relatively large proportions of contracts will be

consummated by physical delivery. However, physical delivery needs a series of services such as transportation, storage, quality inspection and grading. And such services of physical delivery will be required immediately once the futures markets of grain begins to operate. Thus, the delivery spots and traders for different trading grains have to be put in place as soon as possible. Currently, some specialized grain storage and transportation companies could act as candidates for the delivery traders if the administrative barriers of transportation between provinces are eventually eliminated. At the same time, according to geographical disposition of different grain, physical delivery locations of particular grains will be carefully selected and specified throughout the country. These delivery spots should be near the central points of production of particular grain. These spots should have convenient transportation conditions, sufficient storage space, high degree of mechanization and certain minimum financial criteria to guarantee its ability to perform. We will give some suggestions about physical delivery design for particular grain in the following section.

Finally, contract specification of each particular grain is an extremely technical issue which is not discussed here. Some sample contracts are listed in Appendix A which have proven successful futures trading in the West.

### **Two Scenarios for Creating Grain Futures Markets with Chinese Characteristics**

After considering the conditions which make futures markets possible, issues for the development of grain futures markets, and general characteristics of successful futures markets in the West, this section suggests practical alternatives to create grain futures

markets with Chinese characteristics. In fact, the Chinese government is preparing to create two national grain futures markets, based on the development of grain wholesale cash markets -- one in Zhengzhou and the other in Shanghai. Both have already introduced some elements of futures trading and are prepared to transform into futures markets once the conditions for futures trading are in place. With this background, we will analyze the economic rationality of the government's proposed arrangements from the perspective of grain production and distribution geographically. Some constructive suggestions about establishing grain futures markets with attributes appropriate to Chinese circumstances will be made.

It is assumed that the first grains introduced to the futures trading are rice and wheat: the two most important grains planted in China. The production of rice and wheat was 42.4 and 22.1 percent of the total grain production in 1990, respectively (see Table 2.1). Wheat production was mainly located in the central plain regions which cover 5 provinces: Shangdong, Shanxi, Hebei, Henan, Shaanxi and two municipalities: Beijing and Tianjin, and the northeast including three provinces: Heilongjiang, Jilin and Liaoning (Figure 4.1). Rice production regions are in the south-east and south-west parts in China. The regions between these two are the wheat-rice production areas. The three provinces in this region are Hubei, Anhui and Jiangsu. However, as the boundaries of these provinces are not consistent with the dividing lines among agricultural regions, the north part of these three provinces lies in the winter wheat regions and the southern part in the double rice regions. At the same time, some provinces of south-west regions such as Sichuan province also grow wheat in the winter season. This division basically reflects

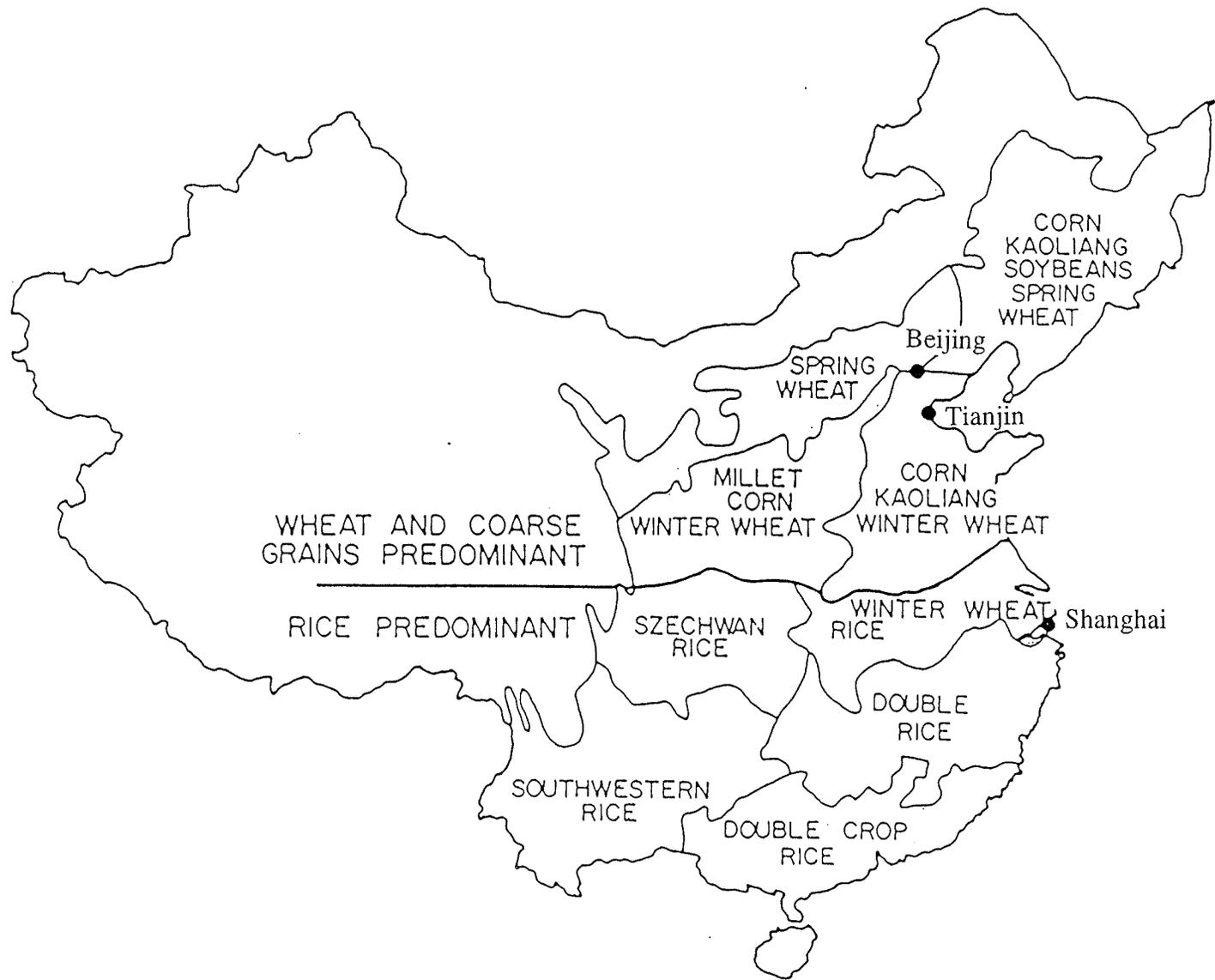


Figure 4.1 Major Grain Growing Regions in the People's Republic of China.

the geographical distribution of the production of these two main grains. On the consumption side, the consuming patterns of grain are fundamentally in conformity with the production pattern; that is, the main food in the south-east and south-west regions is rice, and in the central plains, the west and north-east regions is wheat and flour made from wheat.

However, since there has always been considerable interprovincial variation in per capita grain production and consumption in China as well as uneven distribution of industrial-use grain, a large scale intra- and interprovincial grain transfer system was necessary to meet the basic human and industrial demands. In some areas there have been recent grain shortages while, at the same time, farmers in other areas were complaining of "difficulties in selling grains". It is apparent that the existing grain distribution system among regions has not worked very well.

The main objective for the introduction of grain wholesale markets was to gradually solve the problems of grain flow among regions, especially between surplus and deficit grain areas through the market channels rather than by government redistribution. Since there are differences between the disposition of each particular grain, the grain futures markets should also reflect the geographical characteristics of grain production. Zhengzhou, the capital in Henan province, is located in the centre of middle plains which are the main wheat production regions and one of main aggregation and disaggregation regions for wheat. Therefore, the establishment of a wheat futures market in Zhengzhou reflects the economic facts of grain production and distribution. In contrast, Shanghai, as one of main consumption centres of grain, even though it is not a major aggregation and

disaggregation centre for any grain, is near production areas of rice and other grains. In addition, Shanghai also is one of the largest harbours for grain imports and exports in China. In recent years, with the rapid development of rice, corn and soybean production, the export of these crops has increased. At the same time, wheat imports also increased. Thus, Shanghai, as an international city and an important harbour for imports and exports of grain, is attractive to international and domestic traders alike.

These two cities have good conditions and geographical advantages for creating grain futures markets. In the next sections we will consider how to establish futures markets or how to transform the wholesale cash markets into futures markets. Two scenarios in which each futures market with its own characteristics, and at the same time meeting the international tradition will be presented.

#### ***Scenario One: Zhengzhou Grain Futures Market***

Zhengzhou is a capital of Henan Province. Wheat production in Henan province ranked first place in China and played a very important role in the distribution of wheat among provinces (Table 4.3).

In addition, Zhengzhou is located at the conjunction of two major railways in China and has convenient transportation conditions. There are also well developed commodity and financial markets and good communication facilities. More importantly, Zhengzhou already has a national grain wholesale cash market which has introduced some elements of futures trading including a non-profit governing organization, a membership system, a representative system of trading, margin requirements, commissions, an outcry-

Table 4.3 The Production of Main Grain in Different Provinces (10,000 tons) (1990).

Regions	Total Grains	Rice	Wheat	Corn	Soybean	Potato <sup>a</sup>
Country (Total)	44624.3	18933.1	9822.9	9681.9	1100.0	2743.2
Beijing	264.6	21.6	101.5	130.8	2.8	2.7
Tianjin	188.9	28.2	62.0	74.0	6.6	2.0
Hubei	2276.9	91.6	927.7	829.2	53.5	138.6
Shanxi	969.0	5.4	319.3	305.4	30.2	74.4
Nei Mongol	973.0	31.4	216.7	393.1	47.6	61.3
Liaoning	1494.7	369.2	45.0	798.2	42.7	19.1
Jilin	2046.5	289.4	12.8	1529.6	93.3	29.7
Heilongjiang	2312.5	314.4	474.8	1008.3	325.8	74.1
Shanghai	239.5	177.3	29.1	6.7	1.2	--
Jiangsu	3230.8	1708.5	923.7	230.2	45.1	104.0
Zhejiang	1586.1	1321.4	87.2	9.9	11.4	63.4
Anhui	2457.2	1340.1	598.0	146.9	55.4	259.5
Fujian	879.6	731.2	27.7	3.3	11.2	97.4
Jiangxi	1658.2	1587.7	8.1	2.3	16.9	38.0

Notes:

<sup>a</sup> potato includes sweet potato.

Sources:

State Statistical Bureau, *Zhongguo tongji nianjian, 1989 (Statistical Yearbook of China, 1989)* (Beijing: Statistical Publishing House, 1989); *Zhongguo tongji nianjian, 1991 (Statistical Yearbook of China, 1991)* (Beijing: Statistical Publishing House, 1991).

Table 4.3 The Production of Main Grain in Different Provinces (10,000 tons)  
(1990) (Continued).

Regions	Total Grains	Rice	Wheat	Corn	Soybean	Potato <sup>a</sup>
Shandong	3354.9	90.6	1612.1	1110.9	84.3	364.0
Henan	3303.7	270.0	1639.9	960.5	86.7	253.7
Hubei	2475.0	1789.6	391.1	122.2	26.4	99.6
Hunan	2651.4	2468.2	28.9	24.5	25.4	84.4
Guangdong	1896.9	1677.7	21.9	13.5	13.9	163.1
Guangxi	1363.1	1200.8	2.2	120.0	12.8	23.5
Hainan	169.6	144.2	--	2.5	.6	21.1
Sichuan	4266.8	2197.4	685.3	715.0	34.6	474.6
Guizhou	721.0	360.3	71.8	177.3	12.8	77.1
Yunnan	1057.2	516.5	102.6	277.8	10.0	68.0
Xizang	55.5	0.3	16.4	0.9	6.0	0.2
Shaanxi	1070.7	100.4	463.7	333.8	29.3	64.8
Gansu	690.7	2.4	365.3	116.2	7.7	62.1
Qinghai	114.0	--	73.6	--	--	10.9
Ningxia	190.1	54.3	78.0	37.6	2.4	8.4
Xinjiang	666.2	43.1	391.6	201.2	3.4	3.5

Notes:

<sup>a</sup> potato includes sweet potato.

Sources:

State Statistical Bureau, *Zhongguo tongji nianjian, 1989 (Statistical Yearbook of China, 1989)* (Beijing: Statistical Publishing House, 1989); *Zhongguo tongji nianjian, 1991 (Statistical Yearbook of China, 1991)* (Beijing: Statistical Publishing House, 1991).

auction system, price limitations and the like. The Zhengzhou market has been improving and perfecting the function of its cash market, actively developing forward contracts and encouraging contract transfers before delivery. The Zhengzhou market is expected to follow the usual evolutionary process; that is, from cash market, to forward market, to futures markets; the process William (1982) described in the evolution of grain futures markets in the U.S.A.

Nevertheless, at present the Zhengzhou market is still a cash market. To speed up the process of evolution, in the Zhengzhou market, considerable efforts are now being concentrated on improvements in the storage and transportation infrastructure; gradual standardization of contract terms; creation of a negotiable instrument representing property rights in grain similar to warehouse receipts in other countries; and the gradual introduction of market-makers, or speculators.

In addition, the Zhengzhou market is endeavouring to attract and boost trading activity by instituting an incentive program, and by improving services. These include: obtaining greater inter-provincial transportation priority for grain shipped to satisfy contracts executed in the market, developing a guarantee fund, that now totals about 300,000 yuan to protect traders against extreme price moves, and considering ways to facilitate the clearance of payments from buyer to seller (Zhao Jie, 1992).

To smooth transfer to normalized futures trading of grain in the Zhengzhou market, the following measures should be done as soon as possible:

1. establishing a clearinghouse under the exchange with members of exchange simultaneously becoming members of the clearinghouse, and giving members the responsibility to provide the guaranteed fund;
2. perfecting the margin system to meet the requirements of futures trading;
3. designing a standardized contract along the lines of successful contracts in foreign countries but with Chinese characteristics;
4. improving communication facilities and along with a price reporting and quoting system in the exchange;
5. creating an arbitration agency to settle trading disputes;
6. training potential traders, staff, and propagandizing the knowledge about the futures trading;
7. developing brokers and brokerage agencies; and
8. carefully designing and selecting delivery locations, warehouses and traders for each particular grain.

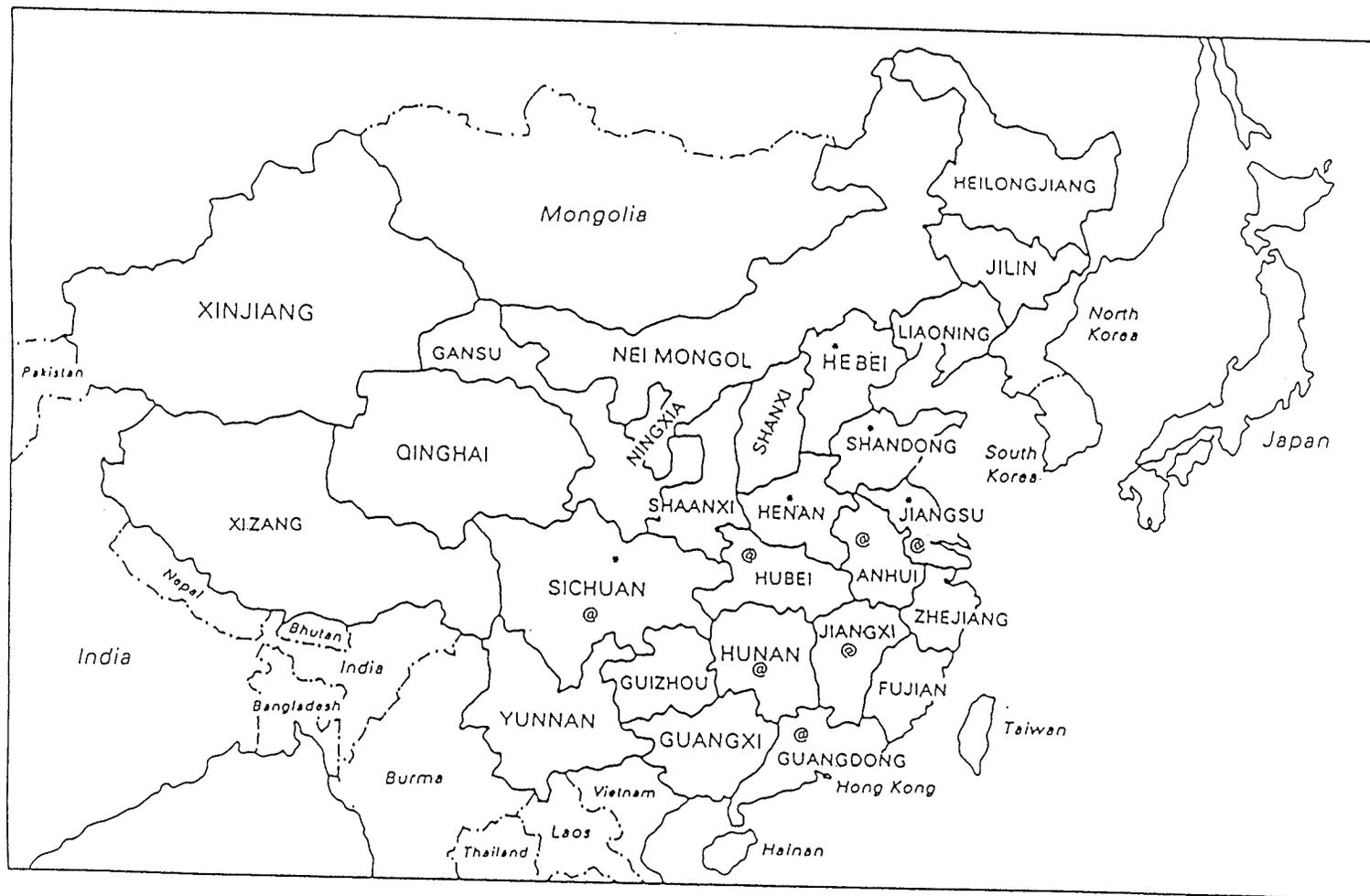
Initially the Zhengzhou grain futures markets will focus primarily on hedging with speculative activities in a secondary role. The reason is that since 1993 the central government has not continued its policy of unified purchase and sale of grain. Under the new policy, the central government only retains a responsibility for purchasing grain for a "reserve system" for the whole country. Local governments have to solve their own problems of grain supply and demand through trading directly between surplus areas and deficit provinces. In these circumstances, local government's grain department must enter the grain cash markets directly and face the risk of price fluctuation in the market. On

both the production and consumption side, they all have the requirement of hedging risks on the futures markets.

However, if the grain futures markets are dominated by hedging there must be sufficient delivery stores or warehouses like the London Grain Exchange in the U.K. otherwise price manipulation or squeezing happens too easily. Therefore, the exchange must carefully choose adequate and sufficient delivery spots, design strict delivery procedures on the contract, and closely monitor the assets of delivery traders. The delivery spots should be located centrally in the production regions of particular grains, which have convenient transportation access, sufficient storage facilities, and are able to guarantee a large amount of grain for delivery. In the case of the wheat futures market, delivery locations can be chosen from the main aggregation and disaggregation centres in the wheat exporting provinces. Figure 4.2 suggests the geographical dispersion of wheat delivery locations. Most of these locations have traditional markets at the main wheat production centres and even newly created grain wholesale markets. The storage and transportation companies of grain at these locations might be chosen as delivery traders during the transition period. Later, specialized delivery traders may have to be authorized by the exchange in order to assure effective delivery.

### ***Scenario Two: Shanghai Grain Futures Market***

The creation of Shanghai PuDong Grain and Oils Exchange is currently under way. It will be the first grain futures market which is ready to directly introduce grain futures trading and at the same time transact grain forward contracts in China. The



• Wheat delivery locations    @ Rice delivery locations

Figure 4.2 Potential Delivery Locations of Wheat and Rice for Grain Futures Markets in China.

organization and operation of the Shanghai grain exchange will basically be in conformity with the international tradition. This study will not focus on these features but rather discuss what characteristics the Shanghai Grain Exchange should have.

From the outset the Shanghai grain exchange should be designed to deal in the international market and try to attract the participation of domestic and international traders. This design is mainly based on the following considerations: First, Shanghai is the largest city and also the largest commercial, financial and industrial centre in China. There are very convenient transportation facilities involving railway, waterway, highway and advanced communication facilities in Shanghai. In addition, Shanghai had been an international city in the past, and has now become the most prospective city for foreign investors and traders. With the improvement of the investment environment and the change in related policies in recent years, large foreign investments are flowing into Shanghai, especially into PuDong district where the exchange will be located. These external conditions and the huge inflow of foreign investment will provide a favourable foundation for the internationalization of the Shanghai Grain Exchange.

Second, Shanghai and many neighbouring cities were located not only in one of the largest grain consumption centres, but also in one of the major grain production regions in China. High population density in Shanghai and neighbouring cities and a large number of food enterprises require a huge amount of grain for consumption. Neighbouring provinces such as Jiangsu, Zhejiang, Jiangxi, Anhua and Shandong all are large grain producing provinces. Thus, Shanghai is closely connected with the central regions of grain

production in which the major crop is rice, usually for export to other provinces or abroad.

Third, China currently is one of the largest wheat importing countries and at the same time a large exporter of rice and corn in the international market. And, Shanghai, as one of the largest export and import harbours in China, can become a link with international grain traders. Since in the international market the prices of grain are determined by many factors, the grain prices often displayed drastic fluctuation over time. To avoid the risks of drastic grain price fluctuations in the world market, the central government usually had to sign long-term bilateral agreements (contracts) for importing grain with the exporting countries. The export agencies for rice and corn in China also have same problems in the international market. If Shanghai Grain Exchange can be internationalized, export/import traders and agencies in foreign countries can directly enter the exchange to take positions. Grain companies of different local governments and food industries also can go directly into the international market through the futures markets. Domestic grain markets could gradually be integrated into the international market. Thus, on the one hand, the state could gradually reduce direct participation in cash transactions with foreign traders and use the grain futures market in Shanghai for more flexible import and export transactions. On the other hand, the state could transfer some of its power to local governments and let the latter take some responsibility for their grain supplies and sales through their participation in the grain futures markets.

Fourth, during the most recent two years, several exchanges began to operate in Shanghai. Among these, the Shanghai Metal Exchange, the first futures market in China,

traded very actively recently and is attracting more international traders to participate in futures trading. Shanghai Coal Exchange, the first Coal exchange in the world, also began futures trading and intends to face the international market. The development of these futures exchanges in Shanghai is providing experience for the internationalization of the Shanghai Grain futures markets.

Finally, although the internationalization of the Shanghai Grain Exchange may be limited and constrained by the lack of the free convertibility of RMB, perpetuating close cooperation between Shanghai Grain Exchange and Shanghai Foreign Exchange Transaction Centre (SFETC) could satisfy traders' requirements to remit funds for margin payments and repatriate any gains on a daily basis so that it would be convenient for international traders and agencies to use and participate in the Shanghai Grain Exchange. Since the cooperation between the SFETC and the Shanghai Metal Exchange, in which foreign traders participated, was done well so far, temporary inconvertibility of RMB should not be an insurmountable obstacle for international traders to participate in Shanghai Grain futures markets.

The Shanghai Grain Exchange should have its own other attributes in terms of its particular geographical location and the level of economic development. First, Shanghai Grain Exchange might be cleared by an independent clearinghouse rather than by a clearinghouse under the exchange. The independent clearing organization could be composed of large banks and/or financial trust agencies in Shanghai as in England. The reason that an independent clearinghouse should be established in Shanghai is that there are now several exchanges such as the Shanghai Metal Exchange and the Coal Exchange

and a potential for more exchanges in the near future. An independent clearinghouse can only not provide more effective services since it becomes professional and more secure since it is usually composed of large banks or large financial corporations and, but also separate liability from the exchange, thus being favourable for monitoring each other.

Secondly, since the Shanghai Grain Exchange would attract both domestic and foreign traders and agencies, most of the domestic grain departments and food enterprises, foreign grain exporters or importers, and even foreign government agencies, might take hedging positions in the exchange. In order to balance the trade between short and long positions, a lot of speculators need to be attracted into the exchange. This might be significantly different from the Zhengzhou market which would be dominated by hedging business with speculation in a supplementary role. Currently, the number of foreign-run enterprises, venture companies, share-holding companies and private enterprises have rapidly increased in Shanghai. In particular, some foreign banks and financial institutions were allowed to do business in Shanghai. Most importantly, the rapid development of the stock market greatly raised a sense of risk investment and management, and even speculation among the general public. These are all favourable conditions to attract potential speculators into the exchange.

Thirdly, the choice of the grain varieties to be traded and the specification of contracts in the Shanghai grain exchange should consider its international and domestic objectives. Wheat is the largest import grain in China. Thus, China either can use overseas futures markets to hedge the wheat varieties which it must import to satisfy domestic need or design contracts for the particular kind of wheat which it needs and is

also produced domestically to trade in the Shanghai futures markets. These contracts might attract hedging by foreign exporters. At the same time, since Zhengzhou market also trades wheat, the Shanghai grain exchange should trade different varieties (or grades) of wheat from the Zhengzhou market by specifying the contract in detail so as to avoid direct competition between the exchanges for the limited amount of wheat available to the market.

The specification of the contract of another grain, rice, seems to be more important, but more difficult for the Shanghai futures market. Rice is not only the largest grain produced in China but also has diverse varieties which are planted at many south-east provinces. In addition, there are very few rice exchanges in the world and hence it is almost impossible to study contract specification in other exchanges. However, Shanghai is located in the wheat-rice and double rice regions in China. In several provinces near Shanghai, rice is the dominant grain. In Jiangxi province, for example, it accounted for 89.5 percent of the total grain area. Although rice production is very large and ranks first place of all grains produced in China, the unified purchasing policy by the state and the thin international market for rice would seriously constrain futures trading of rice. However, the state is gradually opening up its price and expanding the role of market adjustment in the distribution of rice. Hence, rice still is a potential grain variety which could be traded in the futures markets in China. The Shanghai Grain Exchange could introduce rice contract transactions at the beginning through carefully specifying the standardized contract. Delivery procedures and locations could be detailed in the contract after the particular rice variety is specified in contract (see Figure 4.2).

## **Key Issues for Developing Successful Grain Futures Markets in China**

As discussed in chapter 3, some external conditions must be satisfied in order to establish successful grain futures markets in China. However, under the current economic environment, some issues are not easily dealt with because they are often intertwined with the particular social forms in China. Therefore, it is necessary to analyze these issues separately and make constructive suggestions about how to improve each of these to develop successful grain futures markets in China.

### ***Market Participants and Property Rights under the Socialist System***

#### ***Market Participants***

The participants in the grain futures markets under the socialist economic system have different characteristics than those in Western countries. The grain farmers in China would have few opportunities to directly take part in futures trading for hedging because of the very small scale of production and current contract policies. By comparison, in U.S., about 10.7 percent of farmers often took part in the futures trading (wheat) in 1986. Farmers in China would simply use price information provided by the futures markets for their production decisions. The main market participants in China will be the state-run grain companies at different level of governments, large food enterprises, processors, large livestock producers, banks and other financial institutions. These are mostly run and owned by the state. Although private merchants are also allowed to participate in the futures trading, there will be very few number of people who are able to do so, mainly

due to low income levels. Therefore, defining property rights of public ownership enterprises under the socialist economic system is crucial for grain futures trading in China.

### *Property Rights Under the Socialist System*

The characteristics of market participants for grain futures trading under the socialist system is a new issue which was never dealt with before. In grain distribution, the grain departments which are publicly owned used to have monopolistic trading positions. The grain departments did not really run any risks since the state always bore the risks for their transactions.

This affected the quality of enterprise competition and was inappropriate for the market economic mechanisms introduced gradually since the reforms. According to Tang (1992), pre-reform arrangements were inappropriate in the following ways: First, not being independent owners of property rights, enterprises had no motivation for protecting such rights and hence had no economic incentive. Second, since property rights were transferred without compensation, there was no incentive for their effective transfer and hence for the rational allocation of public resources. Third, this system adversely affected enterprises' profit motive. Since they were not liable for the profit consequences of their management, enterprises' motive for improving management, for competition, and for improving economic performance was greatly undermined. Finally, this type of property rights system was inefficient and incompatible with the development of a modern market economy. This does not mean that socialist public ownership must be relinquished and

replaced by capitalist private ownership. Instead, the development of capitalist private ownership in the West shows the relationship between ownership and management is more important than ownership itself (Byrd, 1991). In the large corporations in West, ownership and management became separated and property rights were dispersed, gradually evolving into a modern property rights system mainly characterized by the creation of legal persons.

The reform of China's traditional property rights system must give enterprises the status of property owners, so that they become true commodity producers and managers with independent accounting, and bear the consequences of their management's decisions.

The property rights of this kind will be very important to the development of the grain futures markets in China. In fact, since the reform, the grain departments and other state enterprises such as food enterprises, processors and livestock farms have acquired a certain level of independent economic interests. Although the state used a huge amount of money to purchase grains and then subsidize its consumption and hence bore most price risks in the past, recent reforms of grain distribution is trying to transfer and reduce the risks borne by the state. Currently, the grain departments and food enterprises have to face price risks on the markets and hence have an incentive to avoid the risks even though they still are not independent enterprises in the strict sense.

With the development of a market economy and the increase of per-capita incomes, private individuals in China could also acquire their own property. For instance, they can buy shares in companies and engage in individual or private business. When these privately owned enterprises compete with the public ownership enterprises, should

the latter be given more privilege over the former in futures trading? As two HongKong experts stressed: "In order to maintain the advantage of free competition--to effectively allocate resources and economic efficiency of income, the most important point is to prevent particular privilege used by state agencies, internal information and the favourable policies of the government to control the futures markets and the price fluctuation of commodities. From the country commercial system of point of view, how the state enterprises participate in future trading is one issue" (Zhao Jie, 1992).

In terms of the near perfect competition character of the futures markets, public ownership and private ownership enterprises must have the same opportunity to participate in futures trading. Real price can be discovered and the futures markets can perform its function well only if fair competition exists. In addition, with continual expansion of foreign trade, foreign enterprises will be engaged more and more in Chinese business and futures trading. This calls for a complete set of effective rules and regulations governing both domestic and foreign enterprises ensuring they have the same opportunity to participate in futures trading. These rules and regulations must be codified in law in order to assure fair competition and commitment of contracts between foreign and domestic enterprises.

### *Speculators and market makers*

The two kinds of traders, hedgers and speculators, participate in futures markets. Speculators are necessary for the normal operation of the futures markets. However, even in the West, people often refer to the similarity between commodity futures trading and

gambling. So it is not surprising the speculator's role is misunderstood in China. But, in fact, gambling and speculation are totally different in the economic sense. Gambling involves pure transfers of money between participants. It just wastes time and resources. It does not generate any new social value. In contrast, speculation plays a role in transferring risk from the producer to speculator. This risk always exists in the process of producing and marketing commodities in the market economy. In addition, the concept of speculation as the Chinese usually understood it in the past was different from the sense of speculation in the futures trading. In China, speculative activities were often connected with illegal behaviour through using illegal power and privilege, noncompetitive behaviour and thus not sanctioned officially in the past. But, in recent years, the concept of legal speculation is gradually being recognized and even encouraged in the context of the socialist market economy as the stock market and subsequently, the futures markets, developed. However, speculative activities, even within the exchange are still limited in China.

Although grain futures markets in China would initially mainly depend on hedging business for their existence, futures markets that attract a large volume of speculation are better hedging markets. Grain futures markets enable hedgers to transfer at least some risks of price to speculators who are willing to bear it in the hope of profit. Futures markets that attract a substantial volume of speculative trade are better hedging markets for two reasons.

First, speculation adds to futures market liquidity, which enables hedges to be placed and lifted with minimum price effect. A liquid market can absorb large trades with

a much smaller price effect. Gray (1961) studied three wheat futures markets in the U.S. and found although the area tributary to Minneapolis and Kansas city produced considerably more wheat than was grown in areas tributary to Chicago, Chicago had by the largest wheat futures market, contributing to some 80 percent of the average open interest and some 83 percent of the volume of trading in wheat futures in the U.S. in recent years. The major reason was that the wheat futures market in the Chicago got more speculative trade than the Kansas city and Minneapolis wheat futures market, because Chicago had a better balance between hedging and speculative trade and could absorb larger hedging transactions at lower costs than the other two futures markets.

Second, hedgers, as a group, need speculators to bear the risk for the mismatch between the long and short hedgers. In fact, hedging business is often lopsided and tends to favour the longs or the shorts. In other words, shorting hedging would be rarely equally balanced by long hedging. In the grains, for instance, a large quantities of short hedgers might be placed on the futures markets immediately after harvest when large quantities were sold by farmers and grain companies in the production areas and moved into market channels. Short hedging in this period may exceed long hedging by a considerable margin. The excess of short over long hedging must be absorbed by long speculation otherwise the market may create a price bias that favours the long side. Such a price bias might appear in small futures markets that depended almost entirely upon a hedging trade rather than in large markets such as CBOT which has a better balance between hedging and speculation (Gray, 1967).

In the U.S., except for professional speculators (divided into three groups by Thomas Hieronymus), the largest group of speculators involved with the futures markets were the public customers who place orders at their local brokerage houses. Public traders provide liquidity, interpret information, and facilitate the management of risks for hedgers although their motives are usually to earn a profit. Public customers came from all fields of life and geographical areas and they view the market as an investment medium.

In China, one important issue that needs to be solved is where speculative assets will come from. Who will be the potential professional speculators and what is the possibility for the public to participate in the futures trading? Recent reforms allowed public ownership enterprises to do business with part of their liquid assets in whatever way they wish to a limited extent. Banks and financial institutions are now being reformed to separate the assets for policy uses and for flexible loan uses. The latter could become part of the speculative assets. Some large banks and trust cooperations have recently held a large amount of liquid short term assets from deposits (this figure is 500 billion yuan in 1992). These might become a small part of the potential professional speculators' capital if property rights and the legal body owning public property can be solved in the near future. At the same time, the rapid increases of private enterprises and private income as well as the development of stock markets might create a potentially extensive group of public customers who could participate in futures trading. Under the vigorous economic development of recent years some people, especially in the large coastal cities such as Shanghai and Shenzheng, now have good senses of risk. More importantly, the practice of some current exchanges such as Shanghai Metal Exchange

and Shenzheng Non-ferrous Exchange will stimulate the development of speculative activities. These exchanges will not only provide the experience for grain exchanges but also help to induce futures trading into normalized channels.

### ***Law and Regulations for Futures Markets***

The development of the futures markets in China needs the creation of a set of laws and regulations suited to Chinese characteristics. Laws and regulations not only guarantee normal operation of the futures markets and monitor and guide the whole futures markets, but also will be important in attracting international participants, allowing the exchanges to achieve international status.

The introduction of legislation is a requirement for the normal operation of the futures markets. The futures markets have particular characteristics, compared to the cash markets. First, the futures markets are the centralized place of buyer and seller to do transactions in order to discover prices. They need competitive environments and cannot allow monopoly behaviour including price manipulation. However, under the public ownership system, the state departments often had privilege in the market place and usually caused unfair competition in the cash markets. This often happened in the case of the grain sector. Thus, in order to prevent the appearance of this kind of monopoly behaviour in the grain futures markets, laws and regulations are needed to guarantee a competitive environment. Second, the participants of futures markets are not only producers and consumers, but also include speculators. The shift to a market-oriented economy would even bring the general public into the futures markets.

Speculators are attracted to the futures markets by the wide price swings and the possibility of large profits. Such an increase in trading by the speculating public, while useful to hedgers, brings with it potential market problems. If individual speculators or groups operating in concert obtain control of the futures markets, price manipulation, corners, and squeezes can occur, with adverse effects on producers and consumers alike. If the law and regulations are ineffective or nonexistent, futures markets are difficult to operate effectively and positively. Third, the introduction of contracts in the futures markets serves economic functions and can bring economic benefits to society. However, this objective was often violated because of pure monetary motives in the history of the west. Laws and regulations can monitor and restrict counterproductive practices and assure the healthy development of the futures industry. Finally, many contracts need to be liquidated before delivery and also there are often cases of defaulted contracts. To establish corresponding law and regulations could assure contracts transfer reliably and raise the contract fulfillment ratio.

Viewed from the early development of futures trading in the West, especially in the U.S., futures trading without laws and regulations was usually unfavourable to the public interest. Indeed, a serious issue was that the most common picture of the commodity exchange was one of unbridled speculation, recurrent market manipulations, and spectacular price fluctuation in the 1870's and 1880's. In this period and later, big speculators and market "plungers" openly paraded their power over prices. Farm prices, often low, were further depressed by spectacular price manipulations and even collapsed with recurrent market corners. The irresponsible trading and lack of effective market

regulation in the early period stirred resentment and opposition to futures trading which still exists to some extent. The Grain Futures Act of 1922 and subsequent amendments between 1936 and 1968 did provide for legal action by the government against price manipulation, excessive speculation by the large market operators and against cheating, fraud, and fictitious transactions in futures, thus ensuring the general requirement of open and competitive trading. The Commodity Exchange Act in 1974 emphasized to insure fair practice and honest dealing on the exchange and to provide a measure of control over demoralizing speculative activities which injure producers, consumers, and the exchanges themselves. The enactment of these laws played a critical role in monitoring and guiding the U.S. futures industry into healthy, viable, and thriving development channels.

In addition, the experience in the U.S. showed that law and regulation were not only necessary for developing a healthy futures industry domestically, but were especially important in attracting international participants and allowing the exchanges to achieve international status. It is necessary for both domestic and international futures markets participants to know, in advance, the required standards of performance, the procedures for resolving disputes, and the consequences for failure to perform in accordance with applicable rules. Objectivity and predictability of rules and dispute resolution procedures are important to establish confidence in the integrity of any futures market.

More importantly, to promote the development and internationalization of futures markets in China, priority should be given to the establishment of a national "Law on Futures Trading and Futures Markets", and the creation of a central regulatory authority governing and monitoring the entire futures industry. With a unified body of law and a

national futures trading agency, both domestic and international traders would be better able to understand their rights and obligations. At the same time, domestic brokers and other customers would have the opportunity to provide comprehensive hedging and investment opportunities with great cost-efficiencies and also be able to promote their services without being affected by the inevitable regulatory disparities among product sectors or geographical regions. From the experience of the U.S., the existence of a single regulatory authority and a unified body of law has contributed significantly to the success of the U.S. futures industry in serving both domestic and international users.

However, China is a developing socialist country in which the creation of a law on futures trading meets some difficulties. But it has certain favourable conditions as well. The major difficulty is that China was the first country which established the futures markets under the socialist system without a complete system of law. The main favourable condition is that, as a developing country, China can use the experience of other developed countries. Some points should be emphasized for China in creating a law of futures trading. First, China can directly use the experience from the Western countries which tested and improved the law for about 50 years, especially in the U.S. Second, considering the real situation in the country, China should supplement and modify some laws and regulations which are suited to China rather than transplant every feature from the West. Third, the law should be continuously improved in the process of practice and fitted with the needs of economic development and the public interest. As a general principle, an effective legal structure is a precondition for a successful market mechanism in any country.

## *Futures Markets Versus Adjustment of Current Agricultural Policies*

The agricultural policies in the grain sector will have considerable influence on the futures markets in China. These policies include: the grain pricing policy, financial policy, isolation of regional markets, and distribution policy.

### *The Grain Pricing Policy*

The "double track" pricing and the recent price protection policy were two major policies which had to be modified in the process of the introduction of grain futures markets. The development of the futures trading of grain contradicts the "double track" pricing policy since the planned pricing often affected the market prices of grain and hence distorted the performance of the cash prices of grain. However, in the recent process of price reform, the planned part of pricing has been greatly reduced. In addition, if the planned and market parts of grain pricing can be clearly separated, the issues raised by "double track" pricing could gradually be solved.

Under the recently introduced price protection policy, the central government purchased specified quantities of grain for strategic reserves, at prices that were set above prevailing free market prices. For instance, the protection price for wheat was set in September 1990 at .92 RMB yuan per kg, while the price of wheat at the Zhengzhou market has fluctuated between .79 and .86 RMB yuan per kg. In 1990 the government purchased 25 mmt of grain at protection prices. This price protection policy is not like the U.S. loan policy and nor the minimum price protection adopted in some countries.

This price protection policy has, and will continue to siphon grain from the market and would make futures trading difficult.

In fact, the Chinese government tried to build large stockpiles of the grain through the "state reserve system". Government stocks had a stabilizing effect as the prices of grain are completely opened up. Like the situation in the U.S. in the early 1970's, there was little fear of sharp increases in prices. For when such increases began, government stocks were freed, thus reversing or limiting the price movement. As long as this was true, there was less need for hedging in the futures markets. As a result, it was not possible for futures markets to play an important role in the pricing and marketing of the grain. However, since the market economy is encouraged now, the state should change existing price protection policy into minimum price protection policy or provide other indirect income supports to the grain sector so that the role of market adjustment in the distribution of grain will be raised. Futures markets could perform their function well.

### *Financial Policy*

The cash prices of grain in China were usually distorted by the state's financial subsidy policy. Under this policy, the state almost bore all risks through heavy budget outlays and producers, processors and state-run grain departments had no requirement to avoid risks. However, these implicit subsidies were gradually changed to explicit subsidies and the cash prices of grain were rationalized during recent years. Since the prices of all industrial-use and resident-rationed grain, formerly provided by the government, are now completely opened up, subsidies for these grains would be dramatically reduced. Price

risks in the production and distribution of grain would be shared by all parties on the market rather than absorbed completely by the state. In this case, the producers, processors and other consumers would be increasingly exposed to price risks and hence have incentives to avoid risks. Thus, this adjustment of financial policy would help to develop grain futures markets in China.

### *Isolation of the Regional Markets*

The isolation of regional grain markets would also affect the futures trading. With regional isolation, transportation barriers to physical delivery when grains mature and different guidance prices in different regions could significantly impact the futures trading of grain and even cause squeezing of the market. Isolation of the regional market is usually caused by the following policies and reform measures. These policies include :

1. regional self-sufficiency policy of grain production and consumption rather than allowing specialized production in the context of the whole country;
2. irrational price systems (mainly irrational price ratios between grains and other agricultural products); and
3. different purchase and sale policies among provinces.

Thus, the state needs to adopt policies to integrate the isolated regional markets into a unified national market system and let the market determine prices and allocate resources more efficiently. One significant recent progress in this regard was the establishment of grain wholesale markets at national and provincial level. These could

help to overcome the segregation of the regional markets and form a unified domestic cash market system.

### *Distribution Policy*

Under the grain distribution policy of the past, grain departments represented the government and executed monopolistic purchases and sales of grain. Recent reforms of grain distribution policy allowed private merchants and collective enterprises to enter the business of grain distribution and compete with state-run grain companies. This kind of reform in the distribution system is critical for the development of futures trading. If all market participants (including public and private ownership enterprises) have the same opportunity to participate in the distribution of grain, they will have to face market competition and price risks directly. As a result, they have an incentive to take part in futures trading to avoid risks. The current adjustments of grain distribution policy will have a favourable effect on the development of the futures trading in China.

### **Summary**

This chapter provided a summary discussion of the relationship between international traditions and Chinese characteristics in initially establishing grain futures markets. It is suggested that China should fully absorb the experience of international tradition in grain futures trading and, at the same time, should consider Chinese characteristics as well. The basic characteristics of the grain futures markets in the industrialized countries were briefly analysed. From reviewing the relevant literatures, the

primary conclusion is that successful grain futures trading depends not only on general economic conditions and a well organized structure of futures trading, but also on the characteristics of each particular grain, contract attributes, and even markets in its close substitutes.

Two national grain wholesale cash markets have introduced some elements of futures trading and are ready to engage in the grain futures trading as soon as conditions mature. However, some major problems should be solved before futures trading can be introduced. These includes the establishment of: a) a normalized futures trading structure; b) property rights of market participants; c) an understanding of speculator's role; d) standardized contracts; and e) a unified futures trading law. This chapter analyzed each of these issues.

Based on analysis of these problems, two scenarios for creating grain futures markets with Chinese characteristics were suggested. For the Zhengzhou market, following a natural evolution process from the cash market, to a forward market, to a futures market seems to be the best choice. Concrete measures to transform the wholesale market to a futures market were suggested. In principle, the Zhengzhou market at its initial stage of development would mainly introduce the hedging business supplemented by some speculative activities, and would be limited to domestic transactions. For the Shanghai market, the alternative for developing grain futures markets would be the direct introduction of grain futures trading. From the beginning the Shanghai grain futures markets could be designed to face the international market and try to attract participation of both domestic and international traders. In addition, the Shanghai market could attract

many speculators to participate in futures trading. As far as the contract specifications of particular grains are considered, both markets should trade different varieties of this grain in order to avoid direct competition which would allow sufficient trading volume and liquidity on each exchange.

## CHAPTER 5

### PREREQUISITE FOR DEVELOPING GRAIN FUTURES MARKETS -- IMPROVING CASH GRAIN MARKETS IN CHINA

#### Introduction

As analysed in the previous chapter, the establishment of successful futures markets needs many outside conditions. Among them, a sizable, competitive, and efficient cash market is considered the most important one. Thus, in order to develop the grain futures markets in China, studies on the underlying grain cash markets are necessary since there is a very close relationship between futures markets and cash markets.

Currently, the grain cash market system in China consists of three levels of market forms: township free markets, regional (or provincial) wholesale markets and the national wholesale markets. The township free markets were the basic cash markets which display almost pure competitive characteristics and they served as mainly local supply and demand. At the same time, they have the functions of aggregating local grain which can be transferred to the regional wholesale markets. Because uneven demand and supply of grain exists among regions, the requirement of interregional grain transactions gradually stimulated creation of the grain wholesale markets at the regional and national levels throughout the country. The current grain wholesale markets, where competitive pricing mechanisms were introduced, are dominated by the grain companies of different local governments and mainly serve as a place for trading grain between surplus and deficit

areas. The private intermediate buyers and traders are seldom officially allowed to trade large amounts of grain. In fact, they would find it very difficult to do this kind of transaction since the trading amounts are usually too large for them to afford. Lack of a large number of private participants on the cash wholesale markets might hinder the markets from functioning smoothly. However, some farmers did take an active part in the grain wholesale market and have tended to become the private intermediate buyers and retailers.

According to neo-classical theory, a competitive market must meet some assumption conditions. The futures markets basically meet pure competitive conditions (Leuthold, Junkus and Cordier, 1989). The underlying cash markets are also required to meet the equivalent conditions. In this chapter, we will separately analyse whether the grain cash markets in China satisfy the competitive conditions required by efficient markets and how to further improve the grain cash market system.

### **Cash Markets and Futures Markets**

As stated previously, cash markets and futures markets usually depend on each other and both are influenced by demand and supply forces. The operations of both markets are mainly reflected through the relationship between the cash and futures prices. The relationship between cash and futures prices can be characterized by the following features. First, cash and futures prices tend to move in unison, i.e., if futures price rise or fall, then cash prices should rise or fall by approximately the same amount. Second, the difference between futures and cash prices at any location is defined as the "Basis"

which includes carrying, handling, transportation costs, and any premium or discounts for varying quality. Hence the standard relationship between futures and cash prices is as follows:

$$\text{Futures Price (particular month)} = \text{Cash Price} + \text{Basis}$$

where the Basis includes:

Carrying cost (current month to contract month)

Handling cost (at delivery location)

Transportation cost (the local position to the delivery point)

Any local premiums or discount

Third, cash and futures prices converge as futures contracts mature.

The above relationships are mainly based on the concept of a "perfect" market in which arbitrage should occur whenever there are small differences in net prices. Arbitrage will stop only when net prices are equalized. Arbitrage trading moves cash and futures prices into the proper relationship with each other. The parallel fluctuations and convergence of futures and cash prices makes it possible to hedge for price protection. However, these relationships between cash and futures prices can only exist if both markets work in harmony and are highly efficient and competitive. Since the futures markets were characterized as almost perfectly competitive market mechanism from the outset, the underlying cash markets also need to satisfy almost the same efficiency and competition requirements. Therefore, it is necessary to evaluate whether the grain cash markets in China meet the requirements of efficiency and competitiveness at the current stage, when grain futures markets are about to be introduced.

## **Necessary Conditions for Grain Cash Markets as Efficient Markets in China**

A grain cash market is concerned with the delivery of the agreed quality and quantity at the specified time and place and the prompt payment or exchange of grains in return. It discovers the value of a specific grain of a defined quality and quantity in a specific location to meet immediate requirements. The prices in the cash market respond to demand and supply pressures, but are also affected by other factors such as weather and policies.

In order to introduce grain futures trading, underlying cash markets must acquire efficient and competitive characteristics. According to the standard neoclassical model of perfectly competitive markets, the following necessary conditions must be met for a cash market system to work well in market economies:

1. atomicity of participants, meaning there are so many buyers and sellers, that each transactor is too small to affect the market price;
2. free to enter and exit, implying that transactor can be free to enter and exit the market and to accept or refuse transaction offers;
3. homogeneity of products, meaning that one product is a perfect substitute for another one;
4. perfect information, implying perfect knowledge by buyers and sellers; and
5. no artificial restrictions in demand, supply, or price such as government intervention or collusion among transactors.

### *Atomicity of Participants*

In China, since the decentralization of production authority to households was carried out in 1978, the number of household production units and therefore sellers reached about 222.37 million in 1990. Each household, on average, had 0.56 ha of contracted, cultivated land. So production scale of general households is very small, compared to farmers of the North American. Grain growing households, especially, they have to fulfil the state procurement contract and then could sell the surplus to the cash markets. Therefore, on the township free markets, although a large number of farmer merchants and producers took part in cash trading after harvest, each transaction was too small to affect the market price or overall market conditions. On the buyer sides, although grain companies at different level of local governments were still major buying transactors, many private merchants, collective enterprises and retailers became increasingly important buyers. Except for the state grain departments, their individual transactions were also too small to affect the market price or overall market conditions. Both buyers and sellers are price takers and consider prices as given.

### *Free to Enter and Exit*

Under the present household contract responsibility system, each household is an independent and integrated economic entity, with self-determination in production. This fundamental reorganization of agricultural production has been accompanied by a relaxation of controls over what may be grown and marketed, by price changes favourable to households. "Document No.1" in 1984 further relaxed restrictions on grain production

and marketing, and by mid 1984 households were specifically permitted to buy, transport and sell grain and edible oil without restriction, so long as taxes had been paid and purchase quotas were met. Households can enter the free markets to sell their surplus at market price or sell it to the state at a negotiated price. They can also accept or refuse prices offered by the state grain departments or other buyers on the free markets.

In addition, households are now permitted to contract out their land for payment, to transfer their land to other households or to employ some people to farm their land if they want to leave for other businesses. In the latter case, owners typically require the employee to fulfil the state purchase quota and submit tax for the original household and let employee sell the surplus (Xu Guohua & L. J. Peel, 90).

On the buyer side, the state grain departments, private merchants, collective enterprises and retailers are also free to enter or exit the grain cash markets to do their transactions since the cost of entry or exit is not high.

### ***Homogeneity of Product***

In China, grain products are homogeneous to a limited extent so that one grain variety might be a perfect substitute for another one, especially in a certain geographical range. After 1985, especially, state contracts with individual households took effect for the purchase of grains (Oi, 1988). The contract specifies the type of grain the household will grow, including the seed strain, the quality, quantity and the price the household will receive, and the date and place of delivery within particular administrative regions. Thus, the surplus product after fulfilling the contract basically was homogeneous, at least within

certain areas. However, there were relatively serious problems on grain variety standardization under the household responsibility system. Different varieties which possibly displayed different quality and grades were sometimes planted by different households within some regions. At the same time, there were no strict official inspections of variety quality and grades in many grain cash markets. Hence, the homogeneous condition of grains is still to be improved, especially with expansion of the transactions to a wider range of areas.

### ***Perfect Information***

An efficient market requires that all market participants have equivalent opportunity to access to the market information. Before 1978, however, the market information was highly asymmetric between the state (buyer) and farmers (sellers). Information dominantly flowed through vertical rather than horizontal channels. The government decided the goal of supply, demand and prices for grain and then allocated the quota of production to the lower level governments, and ultimately to farmers every year. Thus, the government kept full information on supply, demand and prices of grain for itself. On the other side, farmers must fulfil the state procurement quota at set prices and even contribute their surplus of grain to the state at negotiated prices. Basically, there was almost no market information on supply, demand, or prices of grain, publicly and privately.

Since reform, the situation has gradually improved. The state abolished the unified procurement system and adopted a contract system in 1985 and increasingly participated

in transactions in grain cash markets through its supply and marketing cooperatives throughout the country. Some recently developed national wholesale grain markets, especially the Zhengzhou Wholesale Grain Market, are providing price information generated from the market for both buyers and sellers locally and nationally through an intermittent communication system. Currently, information systems for agricultural and sideline products can provide considerable information to market participants, despite limitations of its service range. So far, however, there are not any media (such as newspapers, radio and TV) providing formal daily information on supply, demand, or prices of grain, publicly and privately.

#### ***No Artificial Restrictions in Demand, Supply, or Prices***

The artificial restrictions on demand, supply, or prices have been greatly reduced since 1978. So far, the government no longer exercises strict control over prices for meats, eggs, vegetables, and fruits. In 1991, a few provinces including Anhui in the centre of China completely abandoned fixed prices for grain including rice and noodles. In November 1992, the government announced that it was removing price controls on grains in China's most populous province (Sichuan province). Consumers in Sichuan province would pay market prices for rice and other staple grain products (Wudunn, 1992). Recently, Shanghai and Beijing also opened up the grain prices (People's Daily, April 10, 1993). Obviously, the government is ready to open up grain price and let the free markets play an important role in the demand, supply, and prices of grain.

To some extent, further development of China's cash market system for grain in the process of economic reforms will naturally create better conditions for effective competition. In this respect, one distinct development was the establishment of the cash wholesale markets which became more competitive and efficient. But further improvements are needed in conditions like government intervention in markets, administrative segregation, and the improvement of horizontal information circulation, and in product homogeneity. In the following section, we will deal with these issues again.

### **Importance and Significance of the Organized Cash Markets**

As the grain sector in China gradually emerged into an open-market structure, the need for the organized cash markets to facilitate grain trading increased. Although township free markets displayed a near pure competitive environment for grain transactions, the absence of an existing infrastructure to support the cash market - either as an established exchange or set of procedures, represented an obstacle to a functional grain cash market. In addition, township markets can just service local demand and supply of grain and hence play a very limited role in grain distribution and marketing outside the production areas of a particular grain.

However, one recent significant development in the cash market was that there gradually emerged the grain cash wholesale markets with private merchants, collectives and state grain departments dealing in free market grains. Some of these grain cash wholesale markets have an established exchange or set of procedures and hence greatly

expand the function of grain cash markets. Their appearance shows that cash markets have entered a developed stage of organized cash markets.

While the grain cash wholesale market was a logical outcome of the economic momentum created by the reforms, its economic and political significance cannot be understated. The emergence of cash wholesale markets intensified the shift away from the planned state marketing system. Furthermore, since they impinged directly on the relationship between the surplus and deficit areas, such markets could well prove to be the most significant products of rural reforms so far.

In the first place, cash wholesale markets have a direct effect on grain supply and prices. The bulk of grain moving outside the state procurement system were aggregated in the cash wholesale markets and then quickly dispersed to deficit areas and various other buyers through negotiations between sellers and buyers. At the same time, a number of market participants were induced to enter the cash wholesale market where a competitive auction system determined grain prices. They also influenced the supply of many types of raw materials for food industries. Ultimately, they were linked to the supply and demand of grain for China's foreign trade.

Secondly, the cash wholesale markets had a direct effect on many other economic activities. These include transport and storage, market service industries such as processing, information distribution and communication systems, and commercial banking and financial services. In all these areas, the cash wholesale markets operated outside the central planned system and, to a greater or lesser extent, competed with it.

Thirdly, alongwith their economic aspects, these markets had a number of social and political effects. One important aspect was that they led to the development of private merchants, traders and transport operators who made a living out of the ownership and sale of market grain. In the past such people were classed as capitalist speculators and their activities were illegal. Now they are seen as providing an essential service in market operation and as playing a positive role in promoting economic efficiency and the commercialization of grain production and marketing. For example, the state grain departments in Shanghai now face the vigorous competition from the private and collective merchants. Although many uncertainties remain over the precise boundaries between legitimate commercial activity and speculative market dealing, they are officially supported and encouraged.

Finally, well-developed cash wholesale markets would lay a good foundation for the establishment of futures markets in China. The successful development of the futures markets of grain will depend on the size, efficiency and price volatility in the grain cash markets. These aspects were already analysed in detail in the previous chapter and are not repeated here.

### **Some Measures to further Improve Cash Grain Markets in China**

#### ***Improving Competitive Environments of the Grain Cash Markets***

As briefly analyzed before, at present some conditions of competitive cash grain markets need to be improved. Some measures required for achieving competitive cash markets for grain in China have to be adopted.

Firstly, the government has to reduce direct intervention in the marketing of grains and adjust to using indirect methods of influencing market systems without preventing the markets from performing the functions now required of them. For example, if the governmental monopolistic purchase of grain at fixed price would be removed, it could bring at least three substantial benefits for the country. Firstly, the huge financial burden for the state to subsidize the consumption of grain can be drastically reduced. Secondly, households are allowed to decide what they want to produce, depending on prices and marginal income, so that the allocation of resources will be more efficient. Thirdly, it will allow multiple classes of participants to freely enter the cash markets with the same opportunity. Under these circumstances, the cash markets would gradually play an increasing role in the allocation of resources.

In addition, the government has to adequately deal with a new class of private merchants who are actively participating in market trading. Indeed, it is shown that informal relationships between private traders and administrative and transport officials were already very important for the smooth functioning of the free market network. Therefore, private grain merchants should be allowed to participate in grain cash trading. Although grain departments of the local governments dominated in the transaction of grain cash markets, with vigorous competition from the private traders, collectives and minimal government intervention, the performance of grain cash market in which the state participates, could be as efficient as one with only private traders. As long as the government does not provide undue protection or help to its own units, a competitive cash market environment is possible.

Secondly, in grain cash markets, traditional methods used for inspecting the quality of grains was a physical on-sight inspection by the buyer. This has succeeded in many markets in North American by standard grading by the third parties, often a government agency. A similar method of physical on-sight inspection in China was also adopted. However, grading standardization in most free markets was seldom available. One main reason was that sources of grain varieties households planted were diverse. Although pedigree sales gradually increased in the recent years, self-left seeds by households were still widely used in many areas in China. Thus, there are no assurance on the quality and grading of varieties to enter transactions in the cash markets so as to provide confidence in the marketplace. For this, a set of standards for grain which can be accepted by the current grain markets and independent grading and inspection procedure so as to improve homogenous conditions is required. At the same time, standardized descriptions of particular grains and according quality and condition premium and discount schedules must be in place in order to satisfy a homogenous condition of grain trading.

Market information is another major problem for the development of efficient cash markets in China. To effectively enhance the competitiveness of the cash markets, information must be equally accessible to all participants for whom it may have value. For this reason, publicly supported information-generating agencies should be encouraged to produce and disseminate information at subsidized costs to buyers and sellers alike. Public agencies provide market information that can be released to all interested market participants at the same time. This could come in published form such as newspapers,

government circulars, radio or TV broadcasts, commodity newsletters which supported by public funds.

### ***Gradually Establishing Electronic Cash Forward Markets***

Furthermore, facilities and structures of the cash markets, even in the grain wholesale markets, are now relatively simple and hence the scale and amount of transactions between buyers and sellers were highly limited. As the cash markets become larger, and therefore remote from the sites of the particular grain production, facilities for quickly matching buyers and sellers are urgently needed. An electronic market attempts such activity through computer terminals strategically located in the production and consumption areas. Development of an electronic cash market system can provide a opportunity for the principle buyers in production areas and processors in consumption areas to enter bids and offers for grain into a central system which will be capable of "matching" order and consummating trades. Through the system, each trader would be able to quickly scan all the existing bids and offers for the types of grain and locations of interest, and then enter bids and offers for wide exposure to other traders on the electronic system. The computer would determine when a bid and offer matched, notify each party instantaneously that a trade had been completed, and produce written copies of the sale documents. Thus, this can reduce time required in telephoning and other methods and raise market efficiency. Electronic markets provide a low cost method of bringing buyers and sellers together to provide price discovery and to greatly improve the grain cash market's efficiency.

Currently, National Agricultural and Sideline Product Information Network (NASPIN) could be used as the basis of developing electronic grain cash market system in China. The electronic cash market system would be designed to support the following major cash market functions:

1. Entry of Bid/Offer order details at different production and consumption areas;
2. Matching of orders according to agreed algorithms;
3. Rapid search /query facility to find bid/offer opportunities;
4. Ability to "take" bids or offers and consummate trades;
5. Trade reporting to principles;
6. Trade confirmation ability (automatic or required);
7. Market price reporting - internal network and external;
8. Trade details database - on-lines access;
9. post trade consummation - entry and access;
10. Maintenance routines for establishing - premium/discount schedules;
11. Market start-up, operation and shutdown facilities.

This system might absorb the experience from the same system structure employed in successful implementations in Sydney and London. Its architecture applies a central host network consisting of a trading host to match orders, communication hosts that support work stations in different regions, and database systems for logging and monitoring of trading activity. The system would adopt encryption and password security - providing a reliable "closed" system to registered users only.

The development and implementation of such a cash market system would follow the three steps:

1. detailed design phase to define the acceptable markets procedure - potential users - general contract terms and mode of operations;
2. prototype system to test system design and performance; and
3. full scale implementation if market participants showed sufficient interest and need.

### **Summary**

This chapter exclusively analyses the grain cash markets in China. By neo-classical standards, the township free markets were found to satisfy the conditions of pure competitive markets. However, the township free markets are the basic form of cash market system in China and only serve local supply and demand. The appearance of the cash wholesale market, which is an organized cash market, represent a further development of China's cash market system for grain. Indeed, this kind of organized cash market played a very important role in smoothing grain distribution between distant regions, improving other economic activities, stimulating development of private merchants, and eventually developing grain futures markets in China.

In order to further improve the grain cash market system in China, some measures to modify the competitive environment have to be adopted. These measures include the reduction of direct intervention by the government, the establishment of standard quality inspection and grading procedure, and the improvement of information dissemination.

Finally, an electronic cash market system which is a more advanced type of cash market system was suggested. Furthermore, it is recommended that the currently established NASPIN could be used as the basis to develop this electronic cash market system.

## CHAPTER 6

### SUMMARY AND CONCLUSION

#### Summary of the Study

This is one of the early studies to analyse the feasibility of introducing futures markets into the grain sector and the possible role and performance of futures markets in the solution of existing problems of grain production and distribution in China. This study identified the external conditions and foundations of futures markets in terms of the characteristics of futures trading. Furthermore, this study analyzed the feasibility and potential benefits of introducing grain futures trading at the current stage of economic development. Several scenarios of grain futures markets with Chinese characteristics were suggested, with the emphasis on solving some critical problems which may obstruct the development of grain futures trading in China.

As part of its economic reforms, the state has gradually relaxed control of grain distribution and allowed the markets to play a supplementary role in the distribution of grain. With the increased productivity, and increased commercialization, grain output has increased rapidly, especially in the early 1980s. As a result, the amount of grain sold outside the state procurement system also increased rapidly and has stimulated the development of grain cash markets. Furthermore, the state gradually reduced procurement in order to lessen the burden of subsidizing price differences between sale and procurement and recently abolished the procurement system entirely. Thus, the markets

played an increasing role in guiding production and distribution of grain. However, in the transition period from a planned system to a market system in the grain sector, there are also some serious problems such as price variability, production fluctuations, and market dysfunctions, which hurt the interest of producers and consumers. The experience with futures markets in the West showed that futures trading could solve or at least alleviate some of these problems. Thus, it is necessary to introduce futures markets in the grain sector if the market economy is to be continuously pushed forward in China.

The analysis also shows that grain futures markets require some necessary external conditions. Most of these conditions such as transportation, communication, storage, grading, a new understanding of business could be satisfied in China. Some which are not yet fully satisfied are now being improved or beginning to be dealt with. These include accounting standards, RMB convertibility, efficient money transfer, trade matching systems, and the presence of speculators and market-makers.

Furthermore, this study found that although futures trading is a standardized transaction activity and has a long international tradition, futures trading under the particular social forms in China could have many of its own characteristics. Based on a full consideration of these characteristics, two scenarios of grain futures markets which would take advantage of local conditions were suggested. However, in order to develop successful futures markets, some critical issues have to be addressed. Among these, the most important is the legal system and defining property rights of market participants under public ownership and well-developed grain cash markets. The analysis shows that

these problems are receiving attention or are ready to be dealt with as the market economy in China develops further.

Theoretically, competitive cash markets are prerequisites for successful futures trading. Evaluation of the current grain cash markets in China found that both township free markets and wholesale cash markets basically met the standards of competitive markets. Indeed, competitive and organized grain cash markets are being formed throughout the country with the abolition of the state procurement system. Furthermore, an electronic cash market is considered to be the next step in improving the cash market system and some measures for implementing an electronic cash market are suggested.

## **Conclusion**

During the past decade, a huge transformation from unified procurement by the state to market adjustment in the grain sector has been promoted. Grain prices have been entirely opened up. Currently, grain is primarily circulated through market channels rather than by the monopolistic state system as in the past. The grain cash markets have experienced unprecedented growth and three levels of cash market system are being quickly formed throughout the country. However, a cobweb fluctuation of price and production which is often the outcome in agricultural markets has also occurred in the grain sector. Thus, all market participants have to bear the risk which used to be borne by the state. It is in the interest of all market participants to develop a mechanism which can transfer risk. The experience in North America showed that futures markets can act as this kind of mechanism. According to Tian Yuan (1989), if futures markets were

introduced into the agricultural sector, the phenomenon of cobweb fluctuations would improve since futures trading is a mechanism which promotes convergence in price fluctuations.

Futures trading requires some basic conditions. It was found in this study that while individual outside conditions which futures markets rest on still must be improved, most conditions for the development of primary grain futures markets are basically satisfied in the existing economic environment in China. In fact, these conditions are much better than those in the West 150 years ago when futures trading began there.

While China has recently actively developed a market economy, public ownership still plays a dominant role. Thus, establishing grain futures markets must take Chinese circumstances into account, aside from following general international traditions.

Furthermore, international economic environment is also favourable to establishing grain futures markets in China. It is widely recognized that the Pacific region is growing in its importance to the world's agricultural economy, as it is to the world's economy as a whole. There is still no clear centre of grain futures trading for this region. Although Japan has opened its financial futures markets, its agricultural markets are tightly protected. Hongkong and Singapore have successful financial futures markets, but they might have difficulty becoming the centre of futures trading for agricultural commodities because of their lack of an underlying agricultural base and lack of liquid cash grain markets. However, the expansion of South Korea, Taiwan, and Singapore as agricultural import markets, the growing realization of the agricultural potential of the South-East Asian countries, and the growing involvement in agricultural trade of China, all point to

the need for an agricultural futures trading facility somewhere in the Pacific Basin. China could be a logical candidate, not only because of its huge production of agricultural products but also because of its vast domestic market, and its increasing involvement in international trading of agricultural commodities.

After consideration of the available information, this study concludes that the establishment of grain futures markets is necessary and feasible at the current stage of economic development although some conditions required by futures markets have to be further improved. It is further concluded that transformation of two national grain cash wholesale markets which are located at Zhengzhou and Shanghai, respectively, to futures markets is possible in the near term, and it was suggested that each of these grain futures markets has its own particular characteristics. This is not to suggest that futures markets of other centres that were not considered are not appropriate, but rather that establishing futures markets in these two centres already have more favourable conditions for the initial stage of grain futures trading.

### **Limitations of the Study**

This study attempts a qualitative analysis of the feasibility of introducing futures markets into the grain sector in China, based on an evaluation of general economic conditions. It does not provide a cost/benefit analysis of developing grain futures trading. Thus, this study does not test in a quantitative form of the relationship between costs and benefits of grain futures markets. Such an analysis is beyond the scope of this study, and requires data which are not available at present.

A second limitation is that this analysis examines grain commodities in general. Future studies could examine the feasibility of particular grain commodity futures contracts, as well as other non grain futures contracts.

Finally, analysis on the general economic conditions focuses mostly on the country level rather than particular regions where grain futures markets could be located. Therefore, future analysis could study the particular region where a futures market may be set up and its unique characteristics.

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## Appendix A

Table A.1 The Total Sown Area, and the Proportion of the Sown Area Planted to Grain Crops.

Year	Total sown hectares (1,000,000)	Proportion of the total sown area planted to grain crops (%)	Proportion of the total sown area planted to particular grain crops					
			Rice	Wheat	Maize	Soybean	Potato and sweet potato	Other grain crops
			(%)	(%)	(%)	(%)	(%)	(%)
1952	141.3	87.8	20.1	17.5	8.9	8.3	6.2	26.8
1957	157.2	85.0	20.5	17.5	9.5	8.1	6.7	22.7
1965	143.3	83.5	20.8	17.2	10.9	6.0	7.8	20.8
1978	150.1	80.3	22.9	19.4	13.3	4.8	7.9	12.0
1983	144.0	79.2	23.0	20.2	13.1	5.3	6.5	11.1
1984	144.2	78.3	23.0	20.5	12.9	5.1	6.2	10.6
1985	143.6	75.8	22.3	20.3	12.3	5.4	6.0	9.5
1986	144.2	76.9	22.4	20.5	13.3	5.8	6.0	8.9
1987	145.0	76.8	22.2	19.9	13.9	5.8	6.1	8.9
1988	144.9	76.0	22.1	19.9	13.6	5.6	6.2	8.6
1989	146.6	76.6	22.3	20.4	13.9	5.5	6.2	8.3
1990	148.4	76.5	22.3	20.7	14.4	5.1	6.1	7.9

Sources: Editorial Board of China Agricultural Book (1988), *China Agriculture Yearbook 1987 (English Edition)* (Beijing: Agricultural Publishing House, 1988); State Statistical Bureau, *Zhongguo tongji nianjian, 1991 (Statistical Yearbook of China, 1991)* (Beijing: Statistical Publishing House, 1991).

Table A.2 Length of Transportation Routes (10,000 km).

Year	Railway	Highway	Waterway	Airway
1952	2.29	12.67	9.50	1.13
1955	2.56	16.73	9.99	1.55
1960	3.39	51.00	17.00	3.81
1965	3.64	51.45	15.77	3.94
1970	4.10	63.67	14.84	4.06
1971	4.28	67.54	14.16	4.21
1972	4.39	69.99	14.06	4.25
1973	4.43	71.56	13.88	4.53
1974	4.51	73.79	13.74	8.13
1975	4.60	78.36	13.56	8.42
1976	4.63	82.34	13.74	9.78
1977	4.74	85.56	13.74	13.21
1978	4.86	89.02	13.60	14.89
1979	4.98	87.58	10.78	16.00
1980	4.99	88.33	10.85	19.53
1981	5.02	89.75	10.87	21.82
1982	5.05	90.70	10.86	23.27
1983	5.16	91.51	10.89	22.91
1984	5.17	92.67	10.93	26.02
1985	5.21	94.24	10.91	27.72
1986	5.25	96.28	10.94	32.43
1987	5.26	98.22	10.98	38.91
1988	5.28	99.96	10.94	37.38
1989	5.32	101.43	10.90	47.19
1990	5.43	102.83	10.92	50.68

Note: The figure at the end of year.

Sources: State Statistical Bureau, *Zhongguo tongji nianjian, 1991 (Statistic Yearbook of China, 1991)* (Beijing: Chinese Statistical Publishing House, 1991).

Table A.3 Level of Telecommunication Services Development.

	Telephone number/per 100 person	Telephone number/per 100 person in provincial city	Share in the city covered program- controlled telephone exchange ( % )	Share in the city covered auto-switch long-distance telephone network ( % )	Share in the township covered telephone exchange ( % )	Share in the township covered telephone ( % )
1980	0.34	2.1	38.4	N.A.	74.6	95.5
1985	0.60	3.2	40.3	80.5	69.6	94.8
1987	0.75	4.1	49.3	90.0	72.3	95.1
1988	0.86	5.0	54.6	92.4	71.0	95.9
1989	0.98	5.5	61.0	93.9	70.6	95.8
1990	1.11	5.9	70.0	96.6	72.4	97.6

Sources: State Statistical Bureau, *Zhongguo tongji nianjian, 1991 (Statistical Yearbook of China, 1991)*.

Table A.4 Official Exchange Rate of RMB (RMB/U.S. dollar).

Year	Official Exchange Rate
1952	261.70
1955	246.18
1970	246.18
1971	226.73
1972	224.01
1973	202.02
1974	183.97
1975	196.63
1976	188.03
1977	173.00
1978	157.71
1979	149.62
1980	153.03
1981	174.55
1982	192.27
1983	198.09
1984	257.55
1985	320.15
1986	372.21
1987	372.21
1988	372.21
1989	377.00
1990	478.00
1991	532.00

Notes: Rate is the average of the selling and buying rates at the end of year.

Sources: State Statistical Bureau, *Statistical Yearbook of China, 1991*; *Chinese Statistical Abstract, 1992*.

Table A.5 Import and Export of Major Grain in China (10,000 metric tons), from 1975 to 1990.

Year	Import			Export			Net Import		
	Wheat	Rice	Corn	Wheat	Rice	Corn	Wheat	Rice	Corn
1975	389.29	5.00	153.85	0.28	196.80	11.50	389.01	-191.80	142.30
1976	259.85	7.43	186.11	0.21	143.60	13.00	259.64	-136.17	173.11
1977	757.73	0.80	199.58	0.39	112.27	5.60	757.34	-112.19	193.98
1978	834.47	17.12	295.93	0.51	167.77	3.00	833.96	-150.65	292.93
1979	940.70	12.00	539.16	0.63	145.92	4.00	940.07	-133.92	535.16
1980	1225.47	13.00	460.30	0.42	131.06	10.40	1225.05	-118.60	449.90
1981	1366.53	27.30	328.74	0.42	68.47	14.10	1366.11	-41.17	314.64
1982	1430.32	22.34	411.72	0.39	77.59	6.82	1429.93	-55.25	404.90
1983	1226.87	7.50	556.90	0.42	108.70	6.70	1226.45	-101.20	550.20
1984	1083.50	10.26	301.52	0.97	136.98	95.22	1082.53	-126.72	206.30
1985	627.36	21.32	310.83	1.25	104.59	633.76	626.11	-84.27	-322.93
1986	710.37	33.01	366.38	1.81	47.02	564.30	709.56	-14.01	-187.92
1987	1469.26	55.49	524.89	1.26	126.18	391.76	1468.00	-70.69	133.13
1988	1562.26	31.41	456.82	1.17	80.23	391.22	1561.09	-48.82	64.60
1989	1594.54	120.62	435.96	0.50	38.36	350.82	1594.00	82.26	85.14
1990	1348.70	6.25	543.97	0.58	40.54	340.52	1348.12	-34.28	203.45

Sources:

Food and Agricultural Organization of the United Nations, *FAO Yearbook - Trade*, Various Issues.

Table A.6 Domestic Feed Wheat Futures Contract Specifications.

Trading Hours	9:30 a.m. to 1:15 p.m. Central Time
Contract Size	100 tonne board lot; 20 tonne job lot
Deliverable Grades	No.3 Canada Western Red Spring Wheat at par, or No.2 Prairie Spring Wheat at \$5.00 per tonne discount, or No.1 or No.2 Canada Western Utility wheat at \$5.00 per tonne discount, or Canada Western Feed, or No.3 Canada Western Red Winter Wheat at \$5.00 per tonne discount
Delivery Months	March, May, July, October, December
Delivery Point	Thunder Bay
Last Trading Day	Prior to December 1991 - last business day of the delivery month December 1991 and beyond - Eighth business day before the end of the delivery month
Minimum Fluctuation	10 cents per tonne - \$10.00 per board lot
Daily Limit	\$5.00 per tonne above or below previous settlement price - \$5.00 per board lot
Expanded Daily Limit	If two of the nearest three contracts close at normal limit up or down, the daily limit shall expand to 150% of normal for the next three successive business days. If two of the nearest three contract months close limit up or down on the third day of that period, the limit shall remain at 150% of normal for another three day period. The daily limit will revert to normal if no limit move occurs in two of the nearest three contracts on the third day of any such period.
Expanded Daily Limit (Delivery Months)	If a futures contract that is eligible for delivery closes at normal limit up or down, the daily limit for that contract will expand to 150% of normal for the next three successive business days. If that contract goes limit up or down on the third day of that period the limit shall remain at 150% of normal for another three day period. The daily limit will revert to normal if no limit move occurs in that contract on the third day of any such period.

Source: The Winnipeg Commodity Exchange, Commodity Contracts and Trading Facts, September 1991.

Table A.7 Domestic Feed Barley Futures Contract Specifications (Thunder Bay).

Trading Hours	9:30 a.m. to 1:15 p.m. Central Time
Contract Size	20 tonne board lot
Deliverable Grades	48 Lbs. per bushel (59.9 kg/hl), maximum moisture 14.5%, Maximum dockage 2%, all other specifications to meet standards of No. 1 CW barley
Delivery Months	November, February, May, August
Delivery Point	Shipper's location direct to buyer's specified destination. (by truck)
Last Trading Day	First Monday of the delivery month
Minimum Fluctuation	10 cents per tonne - \$2.00 per board lot
Daily Limit	\$5.00 per tonne above or below previous settlement price -\$100 per board lot
Expanded Daily Limit	If two of the nearest three contracts close at normal limit up or down, the daily limit shall expand to 150% of normal for the next three successive business days. If two of the nearest three contract months close limit up or down on the third day of that period, the limit shall remain at 150% of normal for another three day period. The daily limit will revert to normal if no limit move occurs in two of the nearest three contracts on the third day of any such period.
Expanded Daily Limit (Delivery Months)	If a futures contract that is eligible for delivery closes at normal limit up or down, the daily limit for that contract will expand to 150% of normal for the next three successive business days. If that contract goes limit up or down on the third day of that period the limit shall remain at 150% of normal for another three day period. The daily limit will revert to normal if no limit move occurs in that contract on the third day of any such period.

Source: The Winnipeg Commodity Exchange, Commodity Contracts and Trading Facts, September 1991.

Table A.8 North American and U.K. Grain Futures Contracts.

Contract	Contract Month	Trading Hours (Local Time)	Contract Size	Minimum Price Fluctuation	Daily Limit
Chicago Board of Trade					
Corn	3,5,7,9,12	9:30-1:15	5,000 bu.	1/4c/bu. =\$12.50	10c/bu. =\$500
Oats	3,5,7,9,12	9:30-1:15	5,000 bu.	1/4c/bu. =\$12.50	6c/bu. =\$300
Wheat (soft winter)	3,5,7,9,12	9:30-1:15	5,000 bu.	1/4c/bu. =\$12.50	20c/bu. =\$1,000
Chicago Rice and Cotton Exchange					
Rough Rice	1,3,5,9,11	9:15-1:30	2,000 cwt (200,0001b.)	0.5c/cwt =\$10	30c/cwt. =\$600
Kansas City Board of Trade					
Wheat (Hard red winter)	3,5,7,9,12	9:30-1:15	5,000 bu.	1/4c/bu. =\$12.50	25c/bu. =\$1,250
Mid America Commodity Exchange					
Corn	3,5,7,9,12	9:30-1:30	1,000 bu.	1/8c/bu. =\$1.25	10c/bu. =\$100
Oats	3,5,7,9,12	9:30-1:30	1,000 bu.	1/8c/bu. =\$1.25	10c/bu. =\$100
Wheat (soft winter)	3,5,7,9,12	9:30-1:30	1,000 bu.	1/8c/bu. =\$1.25	20c/bu. =\$200
Minneapolis Grain Exchange					
Wheat (Hard red spring)	3,5,7,9,12	9:30-1:15	5,000 bu.	1/8c/bu. =\$6.25	20c/bu. =\$1,000
Oats	3,5,7,9,12	9:30-1:15	5,000 bu.	1/4c/bu.	10c

Sources: 1989 Reference Guide, Trading Facts and Figures, *Futures Magazine*.  
Also, Darrell Duffie, *Futures Markets*.

Table A.8 North American and U.K. Grain Futures Contracts (Continued).

Contract	Contract Month	Trading Hours (Local Time)	Contract Size	Minimum Price Fluctuation	Daily Limit
Winnipeg Commodity Exchange					
Domestic Feed Barley	3,5,7,10,11,12	9:30-1:15	100 metric tons	10c/ton =\$10	\$5/ton =\$500
Alberta Domestic Feed Barley	2,4,6,9,11	9:30-1:15	20 metric tons	10c/ton =\$2	\$5/ton =\$100
Domestic Feed Oats	3,5,7,10,11,12	9:30-1:15	100 metric tons	10c/ton =\$10	\$5/ton =\$500
Rye	3,5,7,10,12	9:30-1:15	100 metric tons	10c/ton =\$10	\$5/ton =\$500
Domestic Feed Wheat	3,5,7,10,11,12	9:15-1:15	100 metric tons	10c/ton =\$10	\$5/ton =\$500
Baltic Futures Contracts (London)					
EEC Wheat ( 'A' and 'B')	1,3,5,6,9,11	11:00-12:30 2:45-4:00	100 metric tons	5pence/ton =&5	
EEC Barley	1,3,5,9,11	11:00-12:00 2:45-4:00	100 metric tons	5pence/ton =&5	

Sources: 1989 Reference Guide, Trading Facts and Figures, *Futures Magazine*.  
Also, Darrell Duffie, *Futures Markets*.

Table A.9 Production of Per Unit Area of Main Grains (kg/mu<sup>a</sup>).

Year	Total Grains	Rice	Wheat	Corn	Soybean	Potato <sup>b</sup>
1949	69	126	43	N.A.	41	94
1952	88	161	49	90	55	126
1957	98	180	57	96	53	140
1962	88	156	46	N.A.	46	129
1965	109	196	68	101	48	119
1978	169	265	123	187	71	180
1979	189	283	143	199	69	173
1980	183	276	126	205	73	189
1981	189	288	141	203	78	180
1982	209	326	163	218	72	193
1983	227	340	187	242	86	208
1984	241	358	198	264	89	211
1985	232	350	196	240	91	202
1986	235	356	203	247	93	194
1987	241	361	199	261	98	212
1988	239	352	198	262	96	199
1989	242	367	203	259	85	200
1990	262	382	213	302	97	201

Notes: <sup>a</sup> 1 hectare = 15 mu.

<sup>b</sup> potato includes sweet potato.

Calculation based on planted area.

Sources:

State Statistical Bureau, *Zhongguo tongji nianjian, 1991 (Statistical Yearbook of China, 1991)* (Beijing: Statistical Publishing House, 1991).

Table A.10 Planted Areas of Main Grains in Different Provinces (10,000 mu<sup>a</sup>) (1990).

Regions	Total Grains	Rice	Wheat	Corn	Soybean	Potato <sup>b</sup>
Country (Total)	170 198.8	49 596.7	46 129.8	32 102.2	11 339.4	13 681.1
Beijing	726.6	51.4	282.6	335.6	17.5	10.9
Tianjin	686.8	68.3	210.4	242.2	67.7	7.3
Hubei	10 241.7	221.6	3 762.5	3 061.2	605.2	650.5
Shanxi	4 935.4	13.8	1 524.1	955.2	377.9	424.9
Nei Mongol	5 811.7	118.7	1 730.4	1 160.3	451.2	368.8
Liaoning	4 682.4	815.0	171.7	2 048.5	523.5	110.5
Jilin	5 288.8	627.6	90.4	3 328.6	695.7	113.0
Heilongjiang	11 130.0	1 010.2	2 671.6	3 252.9	3 118.0	326.5
Shanghai	625.7	380.1	115.7	15.7	8.0	--
Jiangsu	9 544.5	3 681.7	3 598.8	691.5	367.0	332.5
Zhejiang	4 899.0	3 575.3	476.5	72.0	99.7	231.9
Anhui	9 369.1	3 468.5	3 111.5	622.3	784.4	964.5
Fujian	3 120.9	2 267.9	185.7	29.2	134.6	430.3
Jianhxi	5 548.9	4 938.9	112.2	17.8	206.5	191.5

Notes:

<sup>a</sup> 1 hectare = 15 mu.

<sup>b</sup> potato includes sweet potato.

Sources:

State Statistical Bureau, *Zhongguo tongji nianjian, 1991* (Statistical Yearbook of China, 1991) (Beijing: Statistical Publishing House, 1991).

Table A.10 Planted Areas of Main Grain in Different Provinces (10,000 mu<sup>a</sup>) (1990)  
(Continued).

Regions	Total Grains	Rice	Wheat	Corn	Soybean	Potato <sup>b</sup>
Shandong	12 227.9	186.3	6 220.8	3 607.8	672.5	1 114.7
Henan	13 974.1	659.3	7 174.1	3 265.3	959.4	1 119.2
Hubei	7 800.0	3 954.7	2 028.2	579.2	247.0	587.8
Hunan	8 048.5	6 555.6	301.9	182.7	272.6	513.3
Guangdong	5 994.5	4 763.8	136.9	85.7	172.4	751.7
Guangxi	5 459.9	3 815.6	36.8	805.3	320.1	372.6
Hainan	851.2	621.5	--	21.0	10.3	184.3
Sichuan	14 741.6	4 685.7	3 331.8	2 567.3	287.8	2 763.4
Guizhou	3 814.8	1 111.8	661.5	900.1	189.6	615.5
Yunan	5 433.4	1 539.2	854.4	1 484.8	111.4	419.4
Xizang	287.6	1.2	62.8	4.3	37.3	1.9
Shannxi	6 202.0	239.2	2 536.4	1 537.0	432.7	502.7
Gunsu	4 321.7	7.7	2 187.4	450.6	91.5	440.6
Qinghai	600.5	--	320.2	--	--	51.5
Ningxia	1 085.3	90.0	462.7	114.5	57.7	66.0
Xinjiang	2 753.3	126.1	1 770.2	663.6	20.2	13.4

Notes:

<sup>a</sup> 1 hectare = 15 mu.

<sup>b</sup> potato includes sweet potato.

Sources:

State Statistical Bureau, *Zhongguo tongji nianjian, 1991 (Statistical Yearbook of China, 1991)* (Beijing: Statistical Publishing House, 1991).

Table A.11 State Quota, Above-quota and Contract Procurement Prices of Major Grains (yuan per ton).

Year	State Quota and Contract Procurement Price				State Above-quota and Contract Procurement Price			
	Indica Paddy	Japonica Paddy	Wheat	Corn	Indica Paddy	Japonica Paddy	Wheat	Corn
1971	196.2 <sup>a</sup>		268.6	181.8	255.1 <sup>a</sup>		349.2	236.3
1977	196.2 <sup>a</sup>		268.6	181.8	255.1 <sup>a</sup>		349.2	236.3
1978	196.2 <sup>a</sup>		272.2	176.0	255.1 <sup>a</sup>		353.9	228.8
1979	231.4	297.2	329.6	214.4	347.1	445.8	494.4	321.6
1980	231.4	297.2	314.4	214.4	347.1	445.8	471.6	321.6
1981	231.4	297.2	314.4	214.4	347.1	445.8	471.6	321.6
1982	231.4	297.2	314.4	214.4	347.1	445.8	471.6	321.6
1983	231.4	297.2	314.4	214.4	347.1	445.8	471.6	321.6
1984	231.4	297.2	314.4	214.4	347.1	445.8	471.6	321.6
1985	312.0	401.0	424.4	289.4	312.0	401.0	424.4	289.4
1986	312.0	401.0	424.4	289/316	312.0	401.0	424.4	289/316
1987	312/352	401/446	424.4	289/336	312/352	401/446	424.4	289/336
1988	312/352 <sup>b</sup>	401/446 <sup>b</sup>	454.4	289/336 <sup>b</sup>	312/352 <sup>b</sup>	401/446 <sup>b</sup>	454.4	289/336

Notes: <sup>a</sup> only a single paddy price is available prior to 1979.

<sup>b</sup> 1988 price increases are reported in China Daily, 20 January 1988 and 1 April 1988.

Sources: Agricultural Technical Economics Handbook Compilation Committee, *Nongye jishu jingji shouce (Agriculture Technical Economic Handbook)* (Beijing: Nongye Chubanshe 1984); *Jiage lilun yu shijian (Price Theory and Practice)*, various issues (1985-1987). Also, Tarry Sicular (1988).

Table A.12 Market Price for Major Grains (yuan per ton).

Year	Rice Price	Wheat Price	Corn Price	Ratio of Market to Above-quota/Contract Procurement Prices		
				Rice <sup>a</sup>	Wheat	Corn
1977	940	800	600	2.65	2.47	1.72
1978	820	680	500	2.31	2.10	1.41
1979	800	600	420	1.61	1.35	0.85
1980	780	580	400	1.57	1.30	0.85
1981	780	560	360	1.57	1.26	0.76
1982	780	540	360	1.57	1.21	0.76
1983						
1984	(446) <sup>b</sup>	(472)	(322)	(1.00)	(1.00)	(1.00)
1985						
1986	685	650	445/490	1.54	1.54	1.54

Notes:

<sup>a</sup> Ratio of market rice to indica price (converted to paddy at a ratio of 0.70)

<sup>b</sup> Figures in parentheses are rough estimates based on statements about the general relationship between state and market price.

Sources:

Tarry Sicular (1988) P692.

## Appendix B

## Hedging Examples

The basic purpose of hedging is to provide price protection and to minimize the risk. The two main types of hedges, short and long, will be explained as follows:

The Short Hedge - used by a producer or owner of grain who goes short in the futures markets (i.e. sells a futures contract);

The Long Hedge - used by a purchaser who goes long in the futures markets (i.e. buys a futures contract);

Example of the short hedges. Suppose a local grain company (similar to elevator operator) buys 1,000 tonnes of wheat at a cash price of \$150 per ton in October. The company is satisfied to "lock-in" the prevailing cash price which could cover its total net cost of buying, handling and transporting so that it can be allowed to realize a reasonable profit upon sale. To do so, the company sells 1,000 tons of January wheat futures at \$170 per ton.

By December 1, the company arranges for a cash sale of its wheat on the market at a cash price of \$140 per ton. At the same time, it buys back 1,000 tons of January wheat futures for \$150. Since the company buys back the January futures at a lower price than it was sold for, it gets a profit of \$20 per ton ( $\$170 - \$150$ ) on the futures transaction. Although the cash price for wheat has declined \$10 per ton ( $\$150 - \$140$ ), the company can offset the loss on the cash market by getting profit made on the futures transaction. In this case, the basis narrowed by \$10 and the company earns a greater than

anticipated return on its hedge (Table B.1). If, between October 1 and December 1, the wheat price had increased instead, the company would be loss on the futures transaction, but would get profit on the cash transaction. At the same time, it should be pointed out that basis may also move against the position of a hedger with the result that the hedge provides less than full protection against the price movement. This example illustrates why this type of hedge is an exchange of price risk for basis risk. Since the basis risk normally is much smaller than the price risk, and this is why hedging provides the price protection and reduces price variability.

Example of the long hedges. Long hedgers usually use the futures market to hedge uncovered forward sales of their products, that is, they take a "long" position in the futures market. Long hedgers normally include livestock producers, grain processors and grain exporters, etc. Suppose on January 1, a beer brewer receives a substantial order for beer to delivered in August. Based on the current futures prices for barley in August, the estimated basis at that time and the processing costs, the brewer quotes a fixed price for the beer and signs the contract. The price of beer is equivalent to a barley price of \$ 100 per ton. To avoid a loss if barley prices increase between January and July (when the cash barley is expected to be purchased) the brewer buys September barley futures contracts at \$120 per ton in an amount necessary to fill the order (i.e. the number of tons of barley required to produce the contracted quantity of beer). In July, the brewer buys the necessary grade and quantity of barley at \$115 from a producer. Simultaneously, he lifts his hedge by selling barley futures contracts at \$140. By hedging, the brewer has obtained

price protection during the period of vulnerability (January - July) resulting from the forward sale. This use of long hedging as a substitute for the purchase of barley by a beer brewer is summarized in Table B.2. In this case, the brewer pays \$15/ton more for his cash barley, but nets \$20 (less commission and forgone interest on margin) on his futures transaction. As a result, the \$15 increase in cash barley price not only does not affect his cost of production, and instead brings a profit for him because the gain on the futures transaction more than offset the loss on the cash transaction.

Table B.1 An Example of a Short Hedge.

Date	Cash	Futures	Basis
October 1	The company buys 1,000 tonnes of wheat at the price of \$150/tonne	Sells 1,000 tonnes of wheat futures at the price of \$170/tonne	-\$20
December 1	Sells 1,000 tonnes of wheat at the price of \$140/tonne	Buys 1,000 tonnes of wheat futures at the price of \$150/tonne	- \$10
	Loss ----- \$10	Gain ----- \$20	+ \$10
Net Gain From Hedge : \$10			

Table B.2 An Example of a Long Hedge.

Date	Cash	Futures	Basis
January 1	Brewer contracts to sell beer at a price equivalent to a barley price of \$100/tonne	Buys September barley futures contract at the price of \$120/tonne	- \$20
July 1	Purchases barley from producer at the price of \$115/tonne	Sells barley futures contract at the price of \$140/tonne	- \$25
	Loss ----- \$15	Gain ----- \$20	+ \$5
Net Gain From Hedge : \$5			