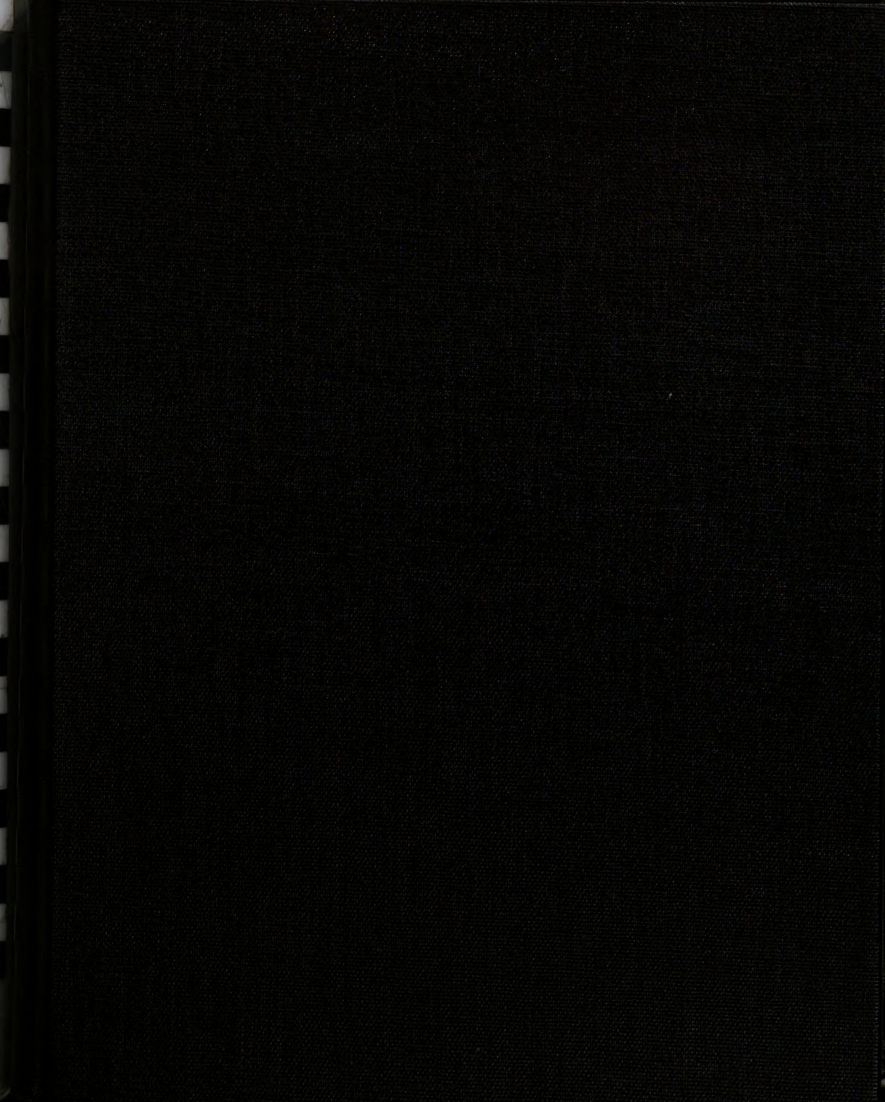






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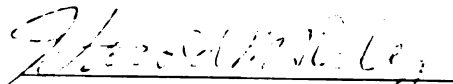
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**MARKET AND FARM HOUSEHOLD LEVEL IMPACTS OF GRAIN MARKETING REFORMS
IN CHINA: A CASE STUDY IN XINXIANG, HENAN PROVINCE**

By

Xianbin Yao

A DISSERTATION

**Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

DOCTOR OF PHILOSOPHY

Department of Agricultural Economics

1990

ABSTRACT

MARKET AND FARM HOUSEHOLD IMPACTS OF GRAIN MARKETING REFORMS IN CHINA: A CASE STUDY IN XINXIANG, HENAN PROVINCE

By

Xianbin Yao

The purpose of this study was to provide a descriptive and diagnostic analysis of market and farm level impacts of grain marketing reforms between 1985 and 1988. A specific interest was to identify opportunities and constraints to public and private traders and producers' capacity and willingness to participate in market level transactions in the process of creating a more dynamically efficient and flexible grain marketing system. The study made use of the structure-conduct-performance paradigm in the market level research and the agricultural household model approach to study the farm household production and marketing behavior. The study relied upon primary data collected during eight-months of field research in 1988 in Xinxian municipality within Henan province.

The study found that the local grain assembly markets were developing into several marketing channels involving both public enterprises and private traders. Village level assembly and direct delivery to distant buyers outside of the study area was the prevailing market practice. Private traders were facing several institutional and policy constraints to expanding their marketing activities, the most important of which included the private traders' lack of stable expectations about government actions, the absence of financial credit for private traders, an

undeveloped market information system, and restrictions on interregional grain movement. These and other factors led to seasonally concentrated and sporadic open market grain assembly and trading activities. At the household level, the study found an unequal land distribution and significant variations in the wheat quota delivery requirements. About 40 percent of the wheat producers were unable to participate in market sales because of high quota delivery requirements, concerns for household food security, and wheat yield instability which reinforced household strategies for maintaining a sufficient on-farm food supply.

The proposed policy changes suggested by this study include: reassessment of markets as a major coordination mechanism and the role of the private sector as an important player in the market; modification of the manner and extent of the public sector's involvement in grain marketing, major institutional innovations towards developing a network of wholesale markets and related market regulatory functions; increasing farmers' market participation by encouraging farm level production, improving marketing infrastructure and strengthening local producers' group action. However, a major constraint to the further development of a market-guided grain system is the highly subsidized urban ration system.

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CURRENCY AND MEASUREMENT EQUIVALENTS

Official Exchange Rate

Currency Unit = RMB Yuan

Calendar 1985:

**1.00 US\$ = 2.94 RMB Yuan
1.00 RMB Yuan = 0.34 US\$**

Calendar 1986:

**1.00 US\$ = 3.45 RMB Yuan
1.00 RMB Yuan = 0.29 US\$**

Calendar 1987 and 1988:

**1.00 US\$ = 3.72 RMB Yuan
1.00 RMB Yuan = 1.00 US\$**

Weights and Measures

**1.00 jin = 0.50 kg
1.00 Kg = 2.00 jin
1.00 mu = 0.0667 ha (1/15 ha)
1.00 ha = 15.00 mu**

CHAPTER I

INTRODUCTION

"What sets China apart from many other developing countries is not that it has increased the use of chemical fertilizer, but how much it has relied on organizational [and institutional] reform to achieve rural development" (Perkins and Yusuf 1984, p. 73). In this light, the rural reforms in China since 1979 are another episode in the institutional change process. Yet the recent rural reforms differs fundamentally from the previous ones, in that they attempt to decentralize the rural economic system and to re-introduce markets as a major coordination mechanism supplemented by a modified system of state intervention in markets. The following statement of Chinese policy makers characterized the essence of the reform attempts, "...the state regulates markets, and markets guide enterprises." (Zhao, 1987)

This dissertation was a study of the experiences with the grain marketing reforms, one of major reform components in rural China during the period from 1979 to 1988. The marketing reform was designed to substantially modify the state monopolized procurement and distribution system and to encourage a greater participation of private traders in grain marketing. The goal was to improve the effectiveness of the marketing system in coordinating grain supply and demand. The present research was designed to provide a better understanding of how the

institutional changes have re-shaped the grain marketing system and to identify the opportunities and constraints that resulted at the market and farm household levels. The unique characteristic of this research is that it was based on primary data collected during an eight-month field study in 1988 when the grain marketing reform reached its climax. The research was sponsored by the Research Center for Rural Development of the China's State Council, a key advisory group on rural policy making in China.

The remainder of this chapter discusses the research background, lays out the specific research problems and study objectives, and outlines the chapter content of the dissertation.

1.1 Background

Between 1978 and 1984 the gross value of China's agricultural output increased 6.8 percent per year. The annual growth rates of the three most important crops, namely grain, cotton and oil-bearing crops, averaged respectively 4.8, 17.7 and 13.8 percent, compared to average rates of 2.4, 1.0 and 0.8 percent per year in the preceding 26 years from 1952 to 1978. During this six-year period, the average net income per capita of rural households more than doubled from 134 yuan in 1978 to 308 yuan in 1984.¹

The rapid growth of the agricultural sector and the improvement in rural household living standards resulted from a series of policy changes and institutional reforms, starting in 1979. The communal organization of agricultural production, upon which China had relied from 1958 through

¹ The data are from China's Rural Economy Statistics Encyclopedia (1989); the monetary values are measured at 1978 prices.

1978, was replaced by a new structure of individualized family farms, called the Household Responsibility System. A significant increase in farm product prices was registered in 1979 along with a nationwide reduction in the base quota of farm products delivered to the state. An increased emphasis was placed on comparative advantage in agricultural production to replace the previous policy on sub-national grain self-sufficiency. The rapid development of rural small-scale industries and the opening up of other non-farming opportunities has also contributed to the large increase in rural household net income.²

With the rapid growth in agriculture and the rural sector some fundamental problems emerged. One of the problems was directly related to the agricultural marketing and distribution system, which had long been dominated by state monopoly and central planning. Although the price policy change from 1978 to 1984 was a shift from strict quantity planning to indicative price planning, the use of price incentives to stimulate agricultural production and marketing turned out to be a mixed blessing. On the one hand, the higher product prices paid by the government grain buying agencies stimulated agricultural output and induced farmers to sell more to the state. Farmers in some areas even reduced their on-farm grain stocks to take advantage of the high purchase prices. On the other hand, the dramatic rise in state purchases increased the financial burden on the state budget since official retail food prices remained low. Furthermore, the state monopoly lacked the price flexibility needed to bring supply and demand into balance. Some products were in surplus in a certain region

² See Ash (1989) for a description of the rural policy reforms during this period. Justin Lin (1989) provided a quantitative analysis of the impacts of policy changes on agricultural growth during 1979 to 1988.

while shortages occurred in other regions. Finally, high purchase prices and guaranteed procurement forced the state to assume most of the risks in marketing. Since consumers were protected by the government rationing system, most consumers did not share the market risks.

As a result of these difficulties, the Chinese government took a bolder approach to reforms in 1985. Earlier that year, the Government announced a gradual phase-out of the state monopoly marketing system for most farm commodities based on compulsory delivery quotas. For grain and cotton, mandatory quotas were to be replaced by a system of the planned purchases by contract and by open market purchases. The government also encouraged a greater participation of private traders in grain marketing. Thus the restructured grain marketing system can be conceptualized as a dual channel one (Table 1.1). The new commercial policy called for an increased role of market exchange in guiding grain production and marketing.

Table 1.1
A Dual Structured Grain Marketing System
in China, 1985 to 1988

	STATE PLAN	MARKET
PUBLIC SECTOR	Planned purchases at fixed prices	Market purchases at flexible prices
PRIVATE SECTOR	-----	Market transactions at flexible prices

The 1985 reforms were followed by a substantial decline in the production of major crops including grain. Furthermore, market prices have been unstable, in some cases doubling and tripling within a year. These unanticipated outcomes have prompted reversals in policy and a retreat from the 1985 reform. Mandatory grain procurement quotas were reimposed in 1989 in most areas. Open market trade has become more restricted in many places than it was before 1985. Some local governments have prohibited private grain movement outside of the local area.

1.2 The Problem Statement

The state monopolized marketing and pricing policies that existed up to 1978 were detrimental to agricultural production and marketing and continued to be inflexible in dealing with the new situations that emerged between 1978 and 1984. On the other hand, the developments in the post-1985 era suggest that many questions remain about the extent, nature, and implications of the re-emergence of market-oriented grain marketing system in China. This research is designed to provide at least partial answers to some of these questions.

The central focus of the research is to describe and assess the impacts of the grain marketing reforms at local assembly market and farm household levels. The marketing reforms are in essence systemic changes in institutional arrangements, designed to shift traditional administrative relationships between the state and producers and consumers towards market transaction relationships. We approach the assessment of the grain market transition by studying the following specific questions:

To what extent has open market trade existed in the grain sub-sector and how have these markets been functioning? What has been the role of private grain traders and how have the state marketing agents participated in market trade? How have farmers perceived and responded to the new marketing opportunities?

This research views the market oriented reforms as a sequence of institutional experiments. The 1985-88 experiment was to have been a gradual phasing down of the state monopolized system. The dual structured system emerged in which both private and public sectors coexist. The goal was to make the system more effective and flexible in providing economic incentives for producers and other market participants and to reduce subsidy costs. The knowledge of how effective this experiment has been and what the problems are thus provides an empirical basis to inform policy makers of the directions for further policy changes.

The literature on China's grain marketing system is pre-occupied with studies of the state marketing organization and price policy. Studies directly addressing free market trade are limited. The early works, including Abbott (1978), Skinner (1965, 1985), Solinger (1984), and Weiss (1982) have examined the free market's role and operations prior to 1980 in a sociological and/or political science perspective. The experiences with opening up grain markets and issues regarding the structure and functioning of these free markets, however, have not received systematic research attention.

The available empirical studies on farmers' production and marketing activities in the wake of the marketing system reforms and new policy environment have presented some mixed and fragmented results. One such

study by the Development Institute of China (Yu, 1987) was to examine how farmers' perceptions had changed since the introduction of the dual marketing structure, and how they had and/or would respond. The research was conducted by means of a farm survey in eight counties in five provinces in 1986/87 crop year. The results show that out of 499 farm households, 413 sold all of their surplus grain to the state procurement stations and local supply and marketing cooperatives, 39 sold to private traders, and 46 sold in "rural free markets". Another study by S. Wen (1987) in one county in south central China indicated that in 1987, "...farmers' share of grain surpluses delivered to the state declined from over 90 percent a few years ago to around 50 - 60 percent during 1985 and 1986." Based on his survey of 32 farm households in Western China, Li (1988) reported that four households of large land holdings were producing primarily for market sales and had sold all of their marketed surplus grain to the state buying agencies; eleven households tended to hold their surplus grain expecting higher prices; and seventeen households reported selling to any trader who offered the highest price.

These studies indicated that farmers now had some choice over their marketing decisions over and beyond the state fixed procurement. However, confusion, ambiguity, and limitations were also shown in the above reported results. In the study by the Development Institute, "rural free markets" were used to describe the marketing channel as an aggregate alternative to state fixed procurement. Also, the sales to the state procurement stations might have included both the quota delivery and "voluntary sales" beyond the quota. Since the former is in fact the state imposed marketing constraint, farmers' open marketing responses likely

differ given this type of constraint. In S. Wen's study, the same issue arose as to what was meant by "rural free markets". There is basically no detailed study on how the free market channels were organized and how farmers got access to these channels. Also, there is a lack of empirical understanding of important determinants which might affect household grain production and marketing responses.

1.3 Research Objectives

The purpose of this research is broadly defined to provide a descriptive and diagnostic analysis of the experience with grain marketing reforms and farmers' grain production and marketing responses. The specific objectives include:

1. To review the evolving pattern of grain marketing reforms that took place between 1979 and 1988 in order to develop a policy perspective at the national level within which a detailed micro-level study is presented;
2. To describe the grain marketing system as observed in 1988, with a primary focus on the existence and functioning of local assembly markets and to identify opportunities and constraints in the assembly markets that were emerging in response to the new policies;
3. To describe farmer grain production and marketing activities and to identify farmers' perceptions and responses to the new marketing opportunities;

4. To develop a conceptual model of the effects of grain quota delivery, marketing transactions costs, and farm and household characteristics on grain production and marketing behavior and to examine empirically the extent of these impacts using household survey data;
5. To draw policy implications from the research findings so as to inform policy makers of possible directions for further institutional changes.

Johnson's (1986) distinction between disciplinary, subject matter and problem solving research assists in clarifying research objectives. The present study can be categorized as a subject-matter research. The multi-layer aspects of this research on grain marketing reforms bring together a set of issues of interest to a set of decision-makers ranging from government policy makers, grain marketing participants, to farm producers. Throughout this study Johnson's remark is kept in mind on the subject-matter research compared to the problem-solving research. "Subject-matter does not produce all the knowledge required to solve all the problems in the relevant set; instead it generates a body of multidisciplinary knowledge useful in solving the problems in the set" (p. 21).

1.4 Organization of The Dissertation

This dissertation contains eight chapters and the structure follows closely the above identified study objectives. Chapter Two begins with a discussion of key features of the state monopolized marketing system

prior to 1978 and then provides a review of several important policy debates regarding the marketing reforms in mid-1980s. This review gives a broader perspective within which the current research is undertaken.

Chapter Three presents a conceptual framework for the research. The discussion is centered around such issues as the role of marketing systems, functions and nature of markets and approaches to understanding farmers' behavior. This conceptual framework was used in the design and conduct of the present study.

Chapter Four describes the field research site, including the reasons for choosing this particular area, its geological-social-economic characteristics, and the major cropping patterns. The field research design and data collection procedures are then discussed.

Chapter Five examines the grain marketing system in the study area. Specific topics in this chapter include the policy changes initiated by the local government, the existence and functioning of local grain assembly markets, market price behavior, and the forms and motives for government regulations in grain markets.

Chapter Six provides a descriptive analysis of farm households' production and marketing activities. Wheat is selected as the central focus in this chapter. Specific issues examined include farmers' wheat production and consumption patterns, incentives and disincentives of the state quota procurement program, characteristics of farmers' "voluntary market surplus sales", and farmers' perception about grain marketing.

Chapter Seven first develops an analytical model of farm household decision makings by incorporating market transactions costs, and then examines econometrically the effects of state quota procurement, farm and

household characteristics and market access factors on farmers' wheat production and marketing decisions.

Chapter Eight sums up major findings of the study, points out some policy implications, discusses in retrospect the field research methods and suggests areas where further research is needed.

CHAPTER II

GRAIN MARKETING REFORMS IN CHINA: A NATIONAL POLICY REVIEW

The choice of an appropriate marketing and distribution system has long pre-occupied the leaders in the socialist movement. During the Soviet's New Economic Policy (NEP) era of the early 1920's Lenin wrote that "Exchange is freedom to trade; it is capitalism. It is useful to us in as much as it will help us overcome the dispersal of the small producers, and to a certain degree combat the evils of bureaucracy." (1975, p. 555) However, this seemingly pragmatic approach was soon replaced by the state forced delivery program in order to "effectively" transfer large amounts of farm products to support the process of rapid industrialization.

This chapter begins with a brief discussion of the key features of the state monopolized grain marketing system in China prior to 1979. It is followed by a review of the policy changes and the consequences during the ten years of grain marketing reforms in the 1980s. An account of the recent policy debates and options and the regional initiatives on further reforms in the grain marketing system precedes the chapter summary and the implications for the present research.

2.1 Key Features of the Grain Marketing System Before 1979

In the early years after the Chinese Communist Party took control in 1949, grain marketing and distribution were primarily operated by the private sector, while the state-owned grain agents also actively participated in buying and selling grains in the markets (Deng, et al). However, by 1953 the state's increasing need for large amounts of surplus grain and the ideological and political attitude towards private grain markets soon resulted in centralized control and quantitative planning over the grain purchase and distribution (Perkins, 1965). In analyzing the factors that led the Chinese government to take this full responsibility, Walker (1984) also observed, "...if inequalities within and between provinces were to be reduced, urban populations supplied from domestic production, and the dire effects of severe fluctuation in output eliminated, the control and mobilization of large quantities of grains were essential"(p. 41) In the course of development of China's economic socialization, rural organization of agricultural production was later transferred from cooperatives into the communal system during the late 1950s. At that time the concern for dispersed farm production and marketing disappeared. While the communal movement was not addressed directly to mobilizing the grain surplus, it helped the Chinese central planners reduce transaction costs by delegating the responsibility for grain procurement to the communal leaders.

Compulsory quota procurement programs were the primary mechanism of the centralized planning of the grain marketing system. The quota delivery requirement covered major farm products such as grain, cotton,

and oilseeds. Production units were required to deliver quota targets to the state. Free market exchange was strictly controlled; only a limited number of agricultural commodities were allowed to be traded at localized periodic markets in the rural areas. Agricultural products were divided into three categories: (1) grain, cotton, and oil-bearing seeds; (2) sugar, tea, pork, poultry and eggs, and medical materials; and (3) "non-essential" products produced in relatively small quantities. Market exchange was permitted only for a small portion of production in the second category (beyond the state quota procurement) and products in the third category. Urban residents obtained their basic supply of grain, cooking oil and cotton cloth at highly subsidized prices through a state-controlled rationing system.

The centrally planned marketing system was coordinated through a vertically administered hierarchy. The central government planned the total grain requirements to be procured through the quota system and then allocated quotas to each province. The province in turn allocated quotas to each of its prefectures, and this process continued on down to the production team, the basic unit of agricultural production and accounting. The Ministry of Food, later the Ministry of Commerce and its subordinate departments at lower levels of government, handled grain procurement, processing, transportation, storage and distribution.

Historically, the centrally controlled marketing system was used to transfer resources from the agricultural sector to the industrial sector. This transfer involved several steps. First, to ensure that the state could obtain the quantities of agricultural products it needed, the central and local governments instituted a production planning

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system, often setting targets in terms of the sown area for products subject to state procurement (Lardy, 1983a). To further ensure that the desired quantities were actually delivered to the state procurement system, the quotas of individual production units were set so high that the units had to turn over their entire output to the state, after deductions for the consumption requirements of the production teams. These high quotas prevented a private market from developing to compete with the state procurement system. The transfer of resources out of agriculture was then completed by setting the quota procurement prices low enough that they included an implicit tax on agriculture, the benefits of which flowed to the other sectors of the economy in terms of lower food and raw product prices.

Between the mid-1950s and the late 1970s, the original state procurement system was gradually modified (Deng, et al). The quotas of individual farm units were periodically reapportioned because, in some rural areas, grain production proved insufficient to support the consumption of team members after deducting quotas. In 1960, an 'over-quota' purchase program at higher prices was introduced to stimulate production, and the base quota purchase prices were raised several times during this period. Also several short-lived policy attempts were made to permit localized grain trade in rural periodic markets. While adjustments were made in the state procurement program in the 1960s and early 1970s, its central feature of compulsory delivery and state monopoly remained unchanged. The base quota delivery was compulsory, and the 'over-quota' purchase later became involuntary (Lardy, 1983b, p.25).

2.2 Policy Changes and their Consequences in Early 1980s

Beginning in 1979, the central government introduced several important policy changes to boost production incentives, including a significant hike in farm purchase prices and a nation-wide reduction of the volume of grain secured through quotas. To maintain the level of total state procurement, a 'negotiated purchase' scheme was restored, in which the state commercial agencies purchased farm products at market prices. These policy changes stimulated agricultural production, and the high state purchase prices induced farmers to sell more to the state. In fact, farmers in some areas even sold their on-farm grain stocks to take advantage of the high state purchase prices (Zhou and Gao, 1988). Furthermore, despite the continued reduction in the base quota quantities, farmers employed a variety of methods to evade the quota delivery in order to sell grain surplus to the state at higher over-quota prices (Sicular, 1989). As a result of these policy shifts, the total state grain procurement, including the base quota, over-quota, and the negotiated purchases, more than doubled from 50.7 million tons in 1978 to 107.5 million tons in 1984, with almost all the increase coming from over-quota purchases (Table 2.1).

But the dramatic supply response to these policy changes created new problems for the central government and for the state procurement system. The dramatic rise in state purchases, especially over-quota procurement, resulted in a mounting burden on the state budget, since the state food retail prices had been kept low. It also overloaded the existing state storage facilities. The costs for state price subsidy

Table 2.1
Grain Production and Purchase Estimates by Channels in China, 1978 - 1987, million tons

Item	1978	1980	1981	1982	1983	1984	1985	1986	1987
Production*	304.8	320.6	325.0	354.5	387.3	407.3	379.1	391.5	404.7
Total Marketed Surplus*	51.9	61.3	68.5	78.1	102.5	117.2	107.6	115.2	120.9
1.State and coop Purchase	50.7	57.1	63.2	72.1	96.7	107.5	90.6	96.1	99.2
a.Quota*	30.8	28.1	26.4	27.3	31.2	28.9	79.0	61.5	60.0
b.Overquota	16.6	20.4	26.3	27.3	58.0	69.3	--	--	--
c.Negotiated	3.3	8.6	10.5	17.5	7.5	9.3	11.6	34.6	39.2
2.Farm Direct Marketing to Urban Consumers	1.2	3.1	3.6	4.3	4.5	4.8	5.5	6.3	6.6
3.Other Channels	0.0	1.1	1.7	1.7	1.3	5.0	11.5	12.8	15.1
Total Marketed Surplus									
As Percent of Production	17.0	19.1	21.1	22.0	26.5	28.8	28.4	29.4	29.9
Quota & Overquota As Percent									
Total Marketed Surplus	91.3	79.1	76.9	69.9	87.0	83.8	73.4	53.4	50.0

* Production is measured in whole grain. All items under the "Total Marketed Surplus" are measured in trade grain, which is the sum of milled rice and millet plus all other grains in whole form.
 "Quota purchases" from 1985 to 1987 refer to the state contract purchase as explained in the text.

Sources: (1) "Production" data are from A Statistical Survey of China 1988, and China Statistical Yearbook 1984; (2) "Total Marketed Surplus" and "Farmer direct marketing" to urban consumers are from China Rural Statistical Yearbook (1985 & 87 editions) and A Statistical Survey of China 1988; (3) "State purchase" data is from China Rural Statistical Yearbook (1985 and 1987 editions); (4) "Quota" and "overquota" purchases for 1978 to 1984 are derived from Contemporary China's Grain Operations (1988), ed. by Xue-ming Deng, p.179 and p.186, and the figures for 1985 to 1987 from the estimates in A Memo on the Grain Problem (1986) by Xiaomeng Gao; (5) "Negotiated" purchases from 1978 to 1984 are from Contemporary China's Grain Operations (1988), p.186; and (6) Data for "other channel purchases" are derived from the figures in the table.

Table 2.2
Losses of State Domestic Grain Marketing and Distribution*
(million yuan, net profits in parentheses)

	1953	1957	1965	1970	1975	1978	1979	1980	1981	1982	1983	1984
Total Losses	(328)	(385)	2302 ^b	2461	5175	3231	7806	10252	12789	14137	16597	20917
of which:												
(1) Expenditures on Over-Quota Price Bonuses	--	--	294	251	1001	1132	3172	4190	6025	6429	8804	12988
(2) Subsidies for Recent Base Quota Price Increases	--	--	--	--	--	65	2450	3561	4068	4591	4663	4791
(3) Expenditures on Grain Purchased at Negotiated Prices but Sold at Ration Price	--	--	--	--	--	--	68	336	515	910	950	--
(4) Subsidies on Grain Purchased at Quota Price & Sold at Ration Price	(321)	(324)	1738	2328	3644	2647	2849	3241	3626	4095	4280	4682
(5) Earnings of State Food and Feed Enterprises ^c	(7)	(61)	(424)	(118)	(353)	(613)	(733)	(1107)	(1504)	(1939)	(2158)	(2512)
Losses As Percent of State Budget Expenditures	(1)	(1)	5	4	6	3	6	8	11	12	13	14

* Figures do not include the pure marketing costs on ration distribution.

^b Includes 694 million yuan losses on grain imports. Other years do not include losses or profits on grain trade.

^c Include earnings from food and feed processing and manufacturing, negotiated grain purchases and sales, transportation and other activities.

Source: Terry Sicular (1988, pp.474-5) for the 1953 to 1978 data. Deng, et al (1988, pp. 435-6) for the 1979 to 1984 data. "State Budget Expenditures" are from China's Statistical Yearbook, 1984 and 1985 issues.

and marketing losses for agricultural products were 5.56 billion Yuan in 1978 and about 32.1 billion Yuan in 1984. These costs represented five percent of the total state budget expenditure in 1978 and 21 percent in 1984 (China State Statistics Yearbook, 1986). Specific to the grain marketings and distribution, total losses by the state grain and edible oil marketing enterprises increased from 3.23 billion Yuan in 1978 to 20.92 million Yuan in 1984, accounting for three percent of the total state budget expenditures in 1978 and 14 percent in 1984 (Table 2.2). A significant share of the losses was for the expenditures on over-quota price bonuses.

The policy changes which took place in the early reform years from 1978 to 1984 can be seen as a gradual shift from strict quantity planning to indicative price planning.¹ The use of price incentives to stimulate agricultural production and marketing turned out to be a mixed blessing. On the one hand, higher prices increased the total marketed surplus. On the other hand, the state monopoly lacked the price flexibility needed to bring supply and demand into balance. For example, some regions and products were in surplus while others were in shortage (Zhou and Gao, 1988, pp. 103-104). The procurement system also created inequities. The base quota levels varied among regions, and so the accrual of above-quota price awards was unequal. Regions with low base quotas were able to sell more at over-quota prices and so received higher average prices, while those with higher base quotas received lower average prices (Sicular, 1988, p. 291). Also, high product prices

¹ For a detailed description of the quantity and price planning in the Chinese agricultural sector, see Lardy (1983a).

and the guaranteed procurement forced the state to assume much of the marketing risk. And perhaps more importantly, being protected by the ration system, most of consumers did not share any of the market risks (Gao, 1986).

2.3 The 1985 Grain Marketing Reforms

The above experience with the state monopolized grain procurement and distribution system resulted in a number of difficulties and problems for the continuation of this system. When the rural reforms were started in 1979, Chinese policy makers stressed that markets were supplementary to the planned economy. In subsequent years, policy debate gradually shifted toward a more market-oriented approach. In 1985, policy makers articulated the view that "...the state regulates markets, and markets guide enterprises."

Several implications of this new view on further reforms of grain marketing system are as follows. First, the state monopoly control on grain marketing was believed to be a necessary strategy when the overall grain supply was in shortage. As a result of the rapid growth in agricultural and grain output in the early 1980s, this strategy lost its usefulness. Second, the mounting burden on the state budget from price policy changes was an immediate concern to the policy makers since the large price subsidies tied up financial resources which could be used in other ways. The high state grain purchase prices induced farmers to produce still more grain at the expense of other crops; the price effect on resource allocation in the agricultural sector was a concern. Third,

the state grain marketing enterprises were a monopoly organization supported by the government. Their operations were inflexible and unresponsive to the changes in grain supply and demand. Further reforms would be needed to change the organizational structure of the state grain marketing system fundamentally and to introduce alternative private sector participation that could compete with the state marketing agents and thus improve overall operational efficiency. And finally, urban consumers have been the greatest beneficiaries of the grain rationing system with highly subsidized retail food prices. Further reforms were to reduce rationed grain sales gradually and increase the urban food prices.

In early 1985, the government of China announced a gradual phase-down of the state monopoly system for most farm commodities based on compulsory delivery quotas. For grain and cotton, mandatory quotas were to be eliminated and replaced by a system of contract and market purchases. A fixed ceiling on the quantity of grain purchased was to be negotiated by the state grain departments with farmers before the planting season. After meeting contract obligations, farmers were allowed to sell any remaining marketable surpluses via other channels at market prices. The contract purchase prices for grain were set by blending 30 percent of the base quota price and 70 percent of the over-quota price in the previous year.² A price floor, at the quota price

² Liu (1986) pointed out that the State Council and Ministry of Commerce calculated this new price by examining the relative shares of base quota and over-quota sales. From 1983 and 1984, the Ministry of Commerce had handled on average 30 percent of the grain in base quota and 70 percent in over-quota purchase. It was therefore believed that the new contract purchase by blending 30 percent of the base quota price and 70 percent

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level, was promised to prevent any sharp plunge of the market prices.

Under the announced contract procurement system, the decision of a farmer to enter a contract with the state might be influenced by such factors as the relative price advantage between the state and free market prices, access to different marketing channels, the farmer's perceptions about the stability of institutions governing the free market and the contract systems, and the in-kind land tax policy. In theory, by forward contract marketing, farmers can be partially or completely protected from the risk in free market prices. This would generate a positive incentive for farmers to enter into a contract with the state.

But the new voluntary contract procurement system has been undermined by a number of factors. First, the state commitment to subsidize urban grain consumers and other groups (e.g., the military) has been a major constraint in reforming the marketing system. While the procurement system was changed, the state food distribution at the retail level did not undergo corresponding changes. Rationing of food grain at subsidized prices has accounted for 80 percent of the food grain total retail sales in mid-1980s (Gao and Zhou). To maintain this level of subsidized sales, the state was compelled to assure that it had access to a reliable supply of food. Second, the new contract purchase

²(...continued)

of the over-quota price would provide roughly equal income in 1985 as that in the early years. Furthermore, this new national price policy allows some regional variations. For example, in areas where the previous base quota procurement was relatively high, the new contract price was determined by blending 20 percent of the base quota price and 80 percent of the over-quota price. In so doing, the new contract purchase program also intended to reduce the regional inequities of the contract procurement.

prices were not attractive enough to induce sufficient voluntary sales to the state. An immediate effect of the new commercial policy was an average 10 percent reduction in marginal grain prices (Sicular, 1988b), though this reduction may have alleviated some of the burden of the price subsidy on the treasury. Third, since under the responsibility system the household is the basic production unit, the administrative cost to the state of implementing the contract purchase program with millions of farm households is very high. The lack of appropriate legal institutions, such as a commercial code, makes it difficult to operationalize the contract program. Fourth, in many grain producing areas, state grain procurement is often interlocked with the in-kind land tax. Local officials and village leaders, who set the level of each farm's land tax (based either on the number of household members or some measure of the farm's productivity) also allocate the procurement contracts among farmers. These officials have an interest in assigning contracts widely among households as this facilitates collection of the land tax. The tax payment is simply deducted from the amount paid the farmers for their grain upon delivery to the state. Farmers therefore perceive the contract as being closely linked with the tax system, which undermines the voluntary nature of the contract (Xu and Men).

The 1985 grain marketing reforms were further undermined by the nationwide concern about that year's unanticipated decline in grain production by seven percent from the record harvest in 1984. The optimism about Chinese agriculture, as a result, was replaced by pessimism. Worries about a sustainable agriculture and rural economy mounted by the claim that the agricultural reforms were no longer

succeeding. As most prominent leaders in China are grain fundamentalists, the disappointing performance of agriculture, triggered by the decline in grain production, has endangered the future of the market-oriented reforms.

Additional policy changes since 1986 included the following; First, the state reduced the total quantity of the contract procurement and increased the state negotiated purchases at market prices. As shown in Table 2.1, between 1985 and 1987 the state contract procurement was reduced by about 24 percent from 79 million tons in 1985 to 60 million tons in 1987, while the state negotiated purchase increased from 12 million tons to 39 million tons. In order to avoid a further increase in the grain price subsidy, the state ration distribution of foodgrain at the retail level has been cut; some industrial grain purchases have been excluded from the subsidized distribution system. Second, the state contract purchase prices were raised modestly. Third, a supplementary input subsidy policy was introduced to link the provision of subsidized fertilizer, fuels and plastic sheeting with the contract procurement delivery. As a result of these various policy efforts, the total grain marketed surplus during this period was basically maintained with some modest increase since 1986 (Table 2.1).

2.4 Rationale for Further Reforms: Debate and Options

During the period from 1985 to 1988, Chinese policy makers within and outside of the government started a series of policy discussions about the future direction of reforms in the grain marketing and

distribution system. The most important issues raised during the debate were: (1) Was the 1985 marketing reform a policy miscalculation? (2) Should the dual structured grain marketing system be maintained and the contract procurement made mandatory once again? (3) How should the market-oriented grain procurement and distribution reforms be viewed? Are they simply policy adjustments within the system of state central planning or is there a need for further institutional innovation to fundamentally change the state monopoly and to create a more competitive and national grain market network? The different viewpoints are briefly summarized below.

The question about the 1985 policy reform was raised as a result of both the decline of grain production in 1985 and the greater instability of market prices that followed and has persisted as grain production failed to recover to the level of 1984 record harvest. One group that viewed the 1985 marketing reforms as a policy mistake argued that the policy makers in early 1985 were overly optimistic about the previous rapid increase in grain supply. They pointed out that the grain supply in China was not in surplus. In fact, the surplus was only a regional and structural phenomenon, that is, some regions and grain products were in surplus while others were in shortage. Furthermore, given China's "national conditions" (i.e., a large population and its limited agricultural resources), the overall grain supply and demand situation would be even more tight in the future. Therefore, to introduce markets in the grain sub-sector would only create more uncertainty and instability. As Yun Chen, a senior Chinese leader, put it, "...grain shortage will lead to social disorder, and we cannot afford to

underestimate this matter." (1986, p.2) This group further argued that the decline in grain production was a result of the relaxed planning by various levels of government officials in directing the farm resources allocated for grain production (Wu, X. 1985).

Another group viewed the "policy mistake" from a different angle (e.g., Gao, Hongbin et al, 1986a, 1986b). They stated that the 1985 reforms were incomplete in that the state still controlled the majority of grain marketings and the planned sphere was operated with a lower (than market) purchase price. As a result, the dual marketing system created many internal conflicts. As grain production was lower, the state planned system became dominant and drove out the free market system. A "true" market system remained underdeveloped. Worst yet, this group argued, because the state purchase price was low, farmers could not be motivated to devote more resources to grain production, thus further aggravating the grain shortage.

There were also two sub-groups of people arguing that the 1985 marketing reforms were not a policy mistake. The first sub-group (e.g., Wu, Xian 1985) pointed out that the very reason for the 1985 policy changes was for the government to "intentionally" reduce grain sown area and to increase non-grain production, in order to further restructure the rural economy. They pointed out that despite the decline in grain production, other farm sectors had improved greatly. However, this group of people soon retreated from the discussion as they saw a somewhat stagnant grain production in the late 1980's.

The second sub-group arguing for the 1985 marketing reforms took a broader view of the overall agricultural and rural economy (e.g., Chen,

Xiwen 1987, 1988, Gao, Xiaomeng and Zhou, Qiren, 1987). They argued that the period from 1979 and 1984 was a time when the Chinese rural economy experienced "super-normal" growth as a result of a set of policy changes introduced during the period. The introduction of the household responsibility system and large increases in state farm product prices resulted in rapid growth in agricultural sector, but that was only a one-time gain. On the other hand, the post-1985 rural economy was thought to be back to a "normal" development. The decline in grain production was farmers' "rational" response to government policy changes and the market situation. In addition, the stagnant grain production and increased market instability was not the result of the 1985 marketing reforms, but rather the consequence of the overall economic changes and of the un-reformed aspects of the economy, especially in the urban sector. For example, the sharp increase in farm input prices since 1985, a large reduction in the state investment in agriculture, and the uncertainty about the household land tenure system contributed to the disincentives for increased grain production.

It should be pointed out that all the above groups agreed that the dual marketing system had shown many drawbacks as it operated from 1985 to 1987. But they differed on how to make any further change. A number of studies argued that the dual system should be maintained at least in the near future (Gao, Xiaomeng 1987, and Mei, Fanquan 1988). One reason is that complete market liberalization by abolishing the dual system might lead to further imbalance in grain supply and demand. One such study stated that "...the planned purchase program had in the past enabled the government to transfer 60 percent of the surplus grain in

major producing regions in central China to the more developed east coastal provinces and another 40 percent to the less developed western areas. If the marketing system was completely liberalized, the east coastal regions would probably attract more surplus grain from the central producing areas because of their higher effective demand and better transportation infrastructure, and as a result the less developed western areas would have much less grain" (Mei, 1986). Gao (1987) pointed out that the very reason for temporally maintaining the dual system was to avoid any large instability of sudden transition. But, Gao went on, saying that even during this transitional period we have to fully realize that the dual system retains one negative element: that is the price disincentive resulted from the fixed procurement and market prices. Therefore, this transitional period, as Gao proposed, must do two things: (1) to develop fully and enlarge the market transactions and (2) to increase the fixed procurement price in order to reduce the price disincentive effect on farmers' quota grain delivery. However, Gao also pointed out that given recent experience, the planned purchase and distribution should be "properly" managed in that the rationed grain sales should gradually be cut in order to increase grain transactions at market levels, "...Because in the past, the large requirement of rationed grain sales had compelled the state to maintain a high level of grain procured through the quota system or to increase the purchase at market prices, thus failing to reduce the total state price subsidy in grain marketing." (Gao, 1989)

As pointed out earlier, there was still a group of researchers who argued against the dual marketing system, because the system had created

internal inconsistencies and conflicts.

Are the reforms simply policy adjustments within the framework of state central planning or is there a need for further institutional changes? This issue received the most attention during the policy dialogue. While some studies vaguely defined the future reforms "...to adhere to the principle of socialist economy of Chinese characteristics" (Wu, 1987), others pointed out several profound challenges and difficulties. Zhou and Gao (1987), for example, stressed that the marketing reforms were to create a competitive marketing environment in which all market participants could provide and gain easy access to marketing services. Grain supply and demand information could be quickly transmitted from consumers to producers, with market prices being an important signal for this transmission. The government's role was to provide support for marketing transactions and intervene when it was necessary to stabilize the market prices. These two authors also pointed out that market participants should hold a legal status, be they private or publicly-owned grain marketing firms. This legal status would strengthen their confidence in participating in grain marketing. They cited an example that although private and cooperative marketing agents had recently emerged in grain marketing, these agents still held an informal status. They also argue that granting the private traders a legal status (private property right) should enhance their credibility in grain marketing.

2.5 Regional Policy Reform Experiments

While some debates were still going on, a number of regions had already taken steps to implement a variety of marketing policy reform experiments. In 1988, these regional policy change initiatives came to full swing. Using the recently published official materials, Table 2.3 summarizes eight regional policy approaches, broken down by three main categories of reform measures (the quota procurement, rationed sales, and supporting policies such as input subsidies, land taxes, and income subsidy policies).

Several observations can be made about these regional grain marketing and price policy reform experiments. First, many of these regional reforms were initiated within the local governments. Of the eight regions only Xinxiang and Yulin had formal approval of the central government. These local initiatives reflected in part the difficulties of grain production stagnation and the large implicit price subsidies incurred by local governments due to reversal of official purchase and retail prices. Second, the procurement policy changes involved either reducing the quota purchase quantity (for example, in Shanxi and Zhunyi, or in Zhouzi to completely eliminate the quota purchase), or increasing the purchase prices (for example in Xinxiang, Yulin, Guangdong and Fujian). It is worth noting that these procurement policy changes are quite closely related to a region's potential in grain production. For example, those areas that had reduced the quota purchase quantity were areas where grain production had not been a very profitable line of activity. On the other hand, the areas whose quota purchase prices were

Table 2.3
Regional Approaches to Grain Marketing and Price Policy Changes in China, 1988

Region	Location in China	% Urban Popul'n	Reform Measures:		
			Procurement Policy (3)	Sales Policy (4)	Supporting Policies (5)
Xinxiang, Henan Province	north central	16	a. Quota purchase only for wheat; b. Increase quota purchase price close to market level;	a. No change for urban ration sales; b. Rural grain resales at new quota prices;	a. Increase of input supply price for fertilizer, fuel; b. Reassess agricultural land tax -- higher than before;
Yulin, Guangxi Province	south China	8	a. Raise rice quota purchase price from 19 to 22 yuan/50 kg; b. If farmers do not purchase subsidized inputs, quota price further increased from 22 to 28 yuan;	a. Raise the rice ration sales price from 14 to 40 yuan/50 kg; b. Ration allowance is maintained but for that month;	a. Government provides part of consumer's supplementary income subsidy, the other part is from the employee's enterprises. No such subsidy for private businessmen.
Zhouzi, Inner Mongolia	north China	12	a. Eliminate quota purchase, replaced w/ market purchase;	a. Eliminate ration sales, replaced w/ market sales;	a. Urban consumers subsidized explicitly with monthly income allowance;
Shanxi province	north central	21	a. Reduce the quota purchase quantity; b. No change in quota purchase prices;	a. Maintain urban ration quantity; b. Exclude rural sales & industry grain uses from ration supply;	a. The urban employee's firms provide income subsidy for the employee's extra grain demand;

Table 2.3 continued

(1)	(2)	(3)	(4)	(5)
Guangdong south Province China	22	a. Increase quota rice purchase price;	a. Increase urban rice ration prices;	a. The purchase price increase is from the original urea input subsidy; b. Eliminate the input subsidy; c. Supplement urban consumers w/ lump-sum income allowance; d. Gov't employee's allowance funded from budget revenue, workers' allowance from firm profits;
Fujian south Province east	17	a. Increase quota rice purchase price;	a. Increase urban rice ration prices; b. Increase rural sales price even higher;	a. Eliminate the input subsidy, b. Use input subsidy revenue for quota price increase; c. Urban consumers supplemented w/ monthly income allowance; d. Unknown on who provides the income allowance;
Zhunyi, south Guizhou Province	7	a. Reduce the quota purchase quantity a. Unknown on any change in purchase price;	a. Maintain urban ration allowance and sales price; b. Exclude rural sales & industry grain use from ration sales;	a. Unknown;
Zhejiang east Province coast	30	a. Increase the input subsidy level; b. No change in quota quantity; c. Institute a quota delivery price bonus;	a. Abolish a kind ration coupon; b. Reduce feedgrain ration sales; c. Strengthen food coupon distrib'n;	a. Institute a levy tax on rural village and township enterprises to cross-subsidize the quota price bonus and higher input subsidy level; b. Restrict grain sales to those w/ "national" food coupons;

Source: "Inter-regional Grain Marketing and Price Reforms Survey Report", Xinxiang Government, 1988

to be increased were areas where grain production has been important rural activities (as in Xinxiang and Guangdong) or where the regional economy was wealthier than others so that it could afford the purchase price increase (as in Fujian).

Third, the grain ration sales policy reforms ranged from no change to urban consumer groups, such as in Xinxiang and Zhejiang, to exclusion of certain consumer groups (especially rural food grain purchaser and industrial users) from the rationed distribution, to hikes in consumer ration prices, such as in Guangdong and Fujian provinces. It should be pointed out that Xinxiang's reform experiment was only carried out for its first phase; the second phase was to eliminate the urban price subsidy and to provide an income subsidy for the lower income groups.

In some provinces the increased cost to the consumer's budget due to the proposed rise in urban ration sales prices was compensated by a monthly income allowance of an equivalent amount. It is nonetheless interesting to note that those people who were self-employed were excluded from this compensation. Table 2.3 also shows that various regions designed different ways to finance the higher purchase prices. For example, in Xinxiang, Guangdong, and Fujian the higher purchase prices were financed by the revenues generated from selling subsidized farm inputs at market prices. On the other hand, in Zhejiang, the provincial government levied a new type of tax on rural village and township enterprises in order to generate revenue to finance the quota price bonuses.

In summary, we see that different regions have attempted to solve grain marketing and price problems with a variety of methods. However,

several problems still prevail. First, these regional reforms would obviously have some spill-over effects on their neighboring regions. How the surrounding regions responded to these changes should have had some significant effects on the success of these regional reform attempts. Second, the success of the reforms is further linked to (or maybe limited by) the fact that some policy provisions are highly uncertain and contingent upon the effectiveness of supporting policies. For example, the planned financing of the purchase price increase from the revenues generated by selling the subsidized farm inputs at market prices will depend upon the following issues: (1) Would the official input distribution be a credible and accessible source of supply? (2) What was the farm input demand situation?

Lastly, the above regional reforms do not seem to have an explicit component of free market reform measures. They may have assumed that the free markets exist or that the state grain marketing agents would be the monopolistic buyers of any market grain supply. We will examine this in detail later as in the case of Xinxiang grain marketing system and price reforms.

2.6 Chapter Summary and Implications

This chapter has described some key features of China's grain marketing system and her recent experiences with marketing reforms. For many years the centralized marketing system had a significant role in the government's industrialization development strategy and maintenance of a stable food supply. But, the inflexibility of the marketing system

and the undervaluation of the agricultural sector have been deterrents to the achievement of a sustained and progressive economic development.

The compulsory grain delivery program was implemented through an administrative marketing system which ignored grain producers' marketing responses. Low state procurement prices discouraged grain production by reducing the income earned from the forced grain delivery. Having realized this detrimental effect the state increased grain purchase prices by an average 22 percent in 1979. Nevertheless, using price incentives to stimulate grain production and marketing resulted in a mixed blessing for the state monopolized grain marketing system. The improvement of producers' incentives through higher prices increased state budget burdens and large grain stocks accumulated in the official marketing channels.

The 1985 marketing reforms included the following policy elements: (1) reducing total quantities of quota grain procured; (2) introducing the contracted purchase program; and (3) increasing the scope of grain trade through markets. The reforms were designed to directly address the mounting price subsidy costs while maintaining producers' incentives for grain production with the promise that the reforms would move the system further toward a market-orientation. However, the 1985 reforms did not fully accomplish the desired effects. The contracted purchase program encountered difficulties as the contracted purchase prices soon became unattractive to farmers. Furthermore, the contracts were actually imposed as quotas and they were often interlocked with the collection of taxes.

Despite the emerging problems and difficulties of grain marketing reforms, further reforms were generally perceived to be necessary. Policy debates during the post 1985 years reveal that a number of the Chinese researchers and policy makers (most prominently those who were in the policy advisory group) contended that only through further reforms would it be possible to improve the efficiency of the grain marketing system needed to support sustained agricultural and rural development. The provincial grain marketing policy experiments described in this chapter also indicate that local government officials have had an increasing interest in the pursuit of further marketing and price reforms in grain subsector.

The overall reform experiences at the national level reveal a piece-meal evolutionary process. The reform initially began with an increase in state grain purchase prices so as to provide greater incentives for grain production, and was followed by a reduction in compulsory quota grain procurement and an increased reliance on market exchange. This evolving pattern of the reforms has been a learning process in which successes and problems with the earlier reform initiatives were fed back into the policy reformation process. More fundamentally the piece-meal reform process implies that changes in policies and economic institutions typically lead to the need for further changes. Because the various institutions are likely to be evolving at different speeds, conflicts and contradictions will arise, calling forth the need for further reform. These conclusions regarding the reform process have immediate implications for the present research about market and farm household level impacts of the recent grain

marketing reforms. It is necessary first of all to have a clear micro-level understanding of the recent experiences of reforms. How has the new grain marketing system developed? To what extent has the private sector engaged in grain trade? What have been the opportunities and constraints as perceived by different grain market participants? And how have grain farmers perceived and responded to the new marketing system? Descriptive and diagnostic information from this study should provide an empirical base and some concrete evidence useful for designing further policy changes.

CHAPTER III

CONCEPTUAL FRAMEWORK

Chapter Two focused on the national level grain marketing reform experiences and provided a general policy context. As we pointed out, although free markets are known to exist for some commodities, little is known about the extent of operation of these free markets and how they have been functioning. The chapters that follow will provide a detailed descriptive and diagnostic analysis of the existence and functioning of grain markets and how farmers perceived and responded to new marketing opportunities in a specific grain surplus area.

This chapter does not intend to provide a comprehensive elaboration nor a literature review of the topics on agricultural marketing theories. Instead, it brings together key concepts critical to our understanding of the existence and functioning of grain marketing and markets in China: Why and how is marketing important? What are the functions and nature of markets? How do farmers respond and why? Finally, what are the relationships between the three issues? This discussion serves as a conceptual framework in guiding the design and implementation of the empirical research that follows.

3.1. Marketing as a Coordination Process

Agricultural marketing plays a strategic role in the process of economic development. Overall increases in national productivity depend heavily on the contribution of the agricultural sector. The efficiency of the agricultural sector can be improved through the marketing system in several ways. First, markets can provide farmers with signals about product prices and potential demand. Second, although productivity increases in agriculture result to a great extent from improved technologies, farmers will only use new technologies if they know about them and the necessary inputs are available when needed. Likewise, well-functioning output markets can effectively stimulate the productivity gain by providing farmers with flexible and efficient marketing outlets. Third, while the marketing system can stimulate economic development, it is also driven by development elsewhere in the economy. For example, the share of the population employed in agriculture usually decreases with economic development, while the proportion of the population employed in other sectors, particularly in urban areas, increases. The marketing system thus not only must develop ways to handle a larger proportion of the total national food product, as the subsistence sector declines, it also must adjust to handling a more complex distribution system since the market chain is extended and becomes more diversified (Elz, p.5).

Looked at from this perspective, the concept of a marketing system involves not only the physical transformation and distribution of products, but also the mechanisms and processes that play an instrumental role in coordinating production, distribution and consumption. Each

individual market participant (producer, trader and consumer) acts within his initial opportunity set in an attempt to achieve his/her defined objective(s). It is the interactions and transactions among these participants that determine quantities supplied and demanded, as well as the timing and location of productive activities. This coordination process occurs through transactions among participants, that in turn informs and influences the activities of producers and consumers. The resulting transactions are the basis of the market coordination process. Thus, in a systems perspective, the marketing coordination process evolves through mechanisms that influence participants' behavior and subsequent outcomes of the system.

Marion (1985) points out that an effective coordinating process is such that "...the various functions of a vertical value adding system are brought into harmony regarding what is produced and marketed, when it is produced and marketed, where it is produced and marketed, how it is produced and marketed, ... (and any) adjustments and adaptations" that might be needed to improve the aggregate results of the process. Shaffer and Staats (1985) indicate that "...the approximate description of the coordination problem is to match supply and demand for every input at every step of the production - distribution sequence at actual or implicit prices consistent with costs.... The coordination problem under uncertainty is clearly complex and difficult. Coordination failure may occur at any step in the sequence of production and distribution of a product but is most obvious in failures to match a productive capacity with ultimate consumer demand at prices consistent with costs." (p. 53)

Matching aggregate grain supply and demand has long preoccupied the policy makers' decision making in China. The issue has become increasingly critical during the economic reform era of the past decade. Grain crops are being produced by millions of farm producers and the final food products are purchased and eaten by hundreds of millions of consumers. The principal grain marketing coordination mechanism is centralized government planning and operations administered through quota procurement and rationed distribution. The basic features of the food-grain ration system were designed in the 1960s and has remained unchanged since then (Deng, et al.). As a result of the changes in consumption patterns associated with the increase in household income in recent years, many households are entitled to a food grain ration allowance which is more than what they actually consume or desire to consume. Hence, there are significant quantities of unused ration coupons in the hands of the households. It was estimated that by the end of 1988, the urban dwellers in China had accumulated unused food-grain ration coupons equivalent to 25 million tons, which is about 100 kilograms per person under the rationing system, accounting for seven months of consumption (People's Daily, Nov. 29, 1989).

This brings us to the difficult task of specifying relevant performance criteria for the marketing system as a coordinating process and how to relate the performance criteria to overall economic development goals. First, it should be recognized that under the centrally planned grain production and distribution China has managed to provide a stable and adequate food-grain supply for her population. From this viewpoint, the central planning system might be praised for its success. But this

achievement has been fulfilled at the expense of many other performance criteria. For example, the emphasis on grain self-sufficiency has constrained the development of other sectors in the rural economy. The forced production of grain in regions with inappropriate natural resources has been very costly (Lardy, 1984). The prevalent food rationing as discussed above has probably led to a significant waste of food-grain by many urban dwellers, while failing to adequately transmit the information of consumers' increased demand for marketing services and a more desirable product mix. The financial burden of the generous and universal food subsidy has constrained the government's capacity to support economic development investment.

Marketing as a coordinating process requires the system to be flexible and effective enough to deal with potential changes in grain supply and demand. The system also needs to accommodate the specialization, urbanization and industrialization that accompany economic development.

3.2 Markets vs. Central Planning as Coordination Mechanisms¹

A simple distinction between the market and central planning is that the market involves bargained transactions, while central planning involves a one-way command system of arranging transactions. But there

¹ The debate on socialist economic theory and practice started during the 1920's and 1930's, known as Lange-Taylor-Dickinson vs. Mises-Hayek-Robbins. The following discussion has no intention to go into the details of that debate. Only a few relevant issues are pointed out. For a recent account of that debate and the classical writings, see Don Lavorie, Rivalry and Central Planning, Cambridge University Press, 1985.

is more behind this simple distinction. In central planning, the planner is assumed to have a capacity to (1) collect information from all members of the economic system; (2) determine the products to be produced and the inputs to be utilized; (3) issue orders to administrative units; and (4) actually exercise its authority.

Two crucial problems with this central planning scheme are the efficient transmission of information and the incentive structure within the system. Obviously, if the central authorities had perfect knowledge of the situation throughout the economy (and adequate technologies for processing it and transmitting the results), they would be able to calculate efficient plans and issue them to the periphery. But, partial ignorance always prevails. This partial ignorance arises as a result of the planner's bounded rationality and also because in the planning process the information may be transmitted inaccurately or in distorted form. For example, Williamson (1975) indicates that in a hierarchy, both "defensive" and "assertive" communication distortions sometimes occur. "Defensively, subordinates may tell their supervisor what he wants to hear; assertively, they will report those things they want him to know" (p. 122). Both types of communication distortions were experienced in the Chinese planning system, which were perhaps most evident during the Great Leap Forward era in the late 1950's in the forms of the exaggerated reports of crop production and procurement targets by communal and county officials (Deng, et al. pp 107-9). Also, the inflexibility of planning further reduces its effectiveness in addressing problems related to uncertainty and the corresponding necessary adjustments. As Timmer (1986) points out, "...It often takes long lines at food shops or signs of urban discontent to break

through the bureaucratic consciousness so that information about scarcities and surpluses arrives at the planning office. Such information may not be very helpful, however, if it is too late for planners to make marketing or production reallocations" (p.141).

A key message of the above discussion is that "...the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess." (Hayek, p. 212) Effective coordination requires the system to make an efficient use of the dispersed information. The "market" provides a mechanism for collecting and summarizing an enormous quantity of idiosyncratic information about production possibilities and preferences in the easily understood form of prices, which at the same time carry incentives to produce and use. Hence, no one needs but a small part of the total knowledge required for production and distribution (Shaffer, et al, 1983).

It is enlightening to mention the reasons behind the practices by Chinese leaders in rejecting the use of markets and flexible pricing mechanism.² Perkins (1965) developed several hypotheses as to why they have done so, including (1) the underdeveloped nature of the Chinese economy, (2) the emphasis on the producers' goods industry and the subsequent need for a quick transfer of resources from agriculture to the industrial sector, and (3) the ideological commitment to socialism and the related political power considerations (pp.198-214). The

² The best account is made by Perkins, Market Control and Central Planning in Communist China (1966).

underdeveloped nature of Chinese economy made the centralized physical controls easier in the sense that there would be only a small number of items with which planners have to deal. The limited interdependence between industry and agriculture may also make the central planning easier as the agricultural sector required only a limited amount of purchases of both consumers and producers' goods. In addition, the nature of economic underdevelopment may also mean that the markets in such an environment are imperfect and that prices may actually lead to major mis-allocations of resources.

Nevertheless, market imperfections, as Perkins stressed, are not why the Chinese communists favor centralized controls. "The real reasons why the regime rejected markets were connected with political considerations and economic policies, which were only indirectly related to the underdeveloped nature of the Chinese economy, the one exception being Peking's (Beijing) desire to achieve rapid structural changes in the Chinese economy, changes that might have been slowed considerably if not centrally controlled." (Perkins, p. 203) In a later study by Perkins and Yusuf (1984), the implications of political considerations and the ideological argument for rejection of the markets were further explored. "For prices to work ...cooperatives, and later production teams, had to be allowed to maximize their incomes, but a nation full of income-maximizing basic accounting units had strong unfavorable ideological overtones. Could leaders who were attempting to educate the population to work for the good of society regardless of personal gain live with a system in which the main criterion for success for 80 percent of the people was income maximization?...." (Perkins and Yusuf, p. 85).

Experiences with the recent market-oriented reforms reflect two major transitions of the Chinese leaders thinking from the previous practice. First, the policy makers have realized that practical problems of centralized control were related to the continuous underdevelopment of the agricultural sector which compromised further development of the industrial sectors. Second, they took a more pragmatic approach deviating from the strong ideological commitment to uphold the orthodox Marxist-Leninist doctrine. During the past ten years the Chinese communist party has gradually changed its position on socialist economic principles. While the socialist identity of the Chinese system was still upheld, the Party announced that the socialist society was now only in its "primary stage", where the markets and commodity production and distribution were among the primary economic mechanisms. The overall operational principle during this primary stage was that "...the state regulates the market, and the market guides enterprises." And "...we should not equate regulation through planning with mandatory planning" (Zhao, pp. 6-7). This type of ideological transition is significant with regard to the policy makers' willingness to pursue market-oriented arrangements, which would likely reduce the transactions costs associated with the reforms, particularly the costs related to the previous ideological commitments.³

³ See Glenn Johnson (1988) for a discussion of institutional changes and the associated transactions costs in the Socialist economies.

3.3 Understanding China's Reform Dilemma

Just how a transition to a market-oriented system would take place and its implications for government regulations in markets remain an issue. A current "reform dilemma" is vividly described by Chinese researchers, that is, "We relax and get chaos, we tighten and get inertia" (e.g. Gao and Zhou). As another researcher would argue, under the previous centrally controlled marketing system, farmers at least could get a secure (albeit low) source of income from the state. With the production and distribution now being guided by market forces, farmers might be open to potential uncertainty and instability created by market forces. (Oi, 1986)

It is worth emphasizing that while the previous marketing system represented an explicit relation among the state, producers and consumers, no direct transactions took place between producers and consumers. The reforms essentially were to break up that administrative relationship and to establish new market transaction relationships. With this transition, the state would assume an implicit role in the marketing system. Along this line of thinking, we hypothesize that the "reform dilemma" as mentioned above probably is attributed either to lack of new institutional arrangements to govern potential transaction relationships among producers and consumers, or to the ways that the state undertakes its new implicit role as the market regulator, or both.

The recent theoretical developments in institutional economics (Bromley, 1989) and transactions cost theory (Williamson), and the applications of these approaches to analysis of the issues of marketing systems and economic development in the developing countries (e.g. Bromley

1988, Bromley and Chavas, Shaffer et al, Staatz) provide some conceptual insights which are pertinent to our understanding of the aforementioned "reform dilemma".

Two related yet different conceptual views are most relevant here. The first view takes the approach of institutional arrangements as overall systems design. The institutions, thus interpreted, serve as the legal foundation of the economy (Bromley, 1989). Specifically, the existence of well functioning markets and the marketing system are supported by a set of formal and informal institutional arrangements. These institutions define property rights, legal tender, norms of acceptable behavior, etc, in the market coordination process. An essential role of institutions is for each participant in the markets and along stages of the marketing system to have a set of stable expectations when undertaking the marketing activities (Bromley, 1989, p. 47), thus reducing the transactions costs in searching, negotiating and monitoring the terms of market transactions.

The second conceptual view of relevance to the present study is about behavioral choice of alternative arrangements by marketing participants in an attempt to reduce the transactions cost posed by the existing spot-market structures. Williamson emphasizes that the failure of spot-market transactions may occur due to a combination of human factors (such as bounded rationality and opportunistic behavior), environmental factors (such as uncertainty and imperfect information), and the discontinuity and irreversibility of making investment and disinvestment decisions (as a result of asset fixity). Alternatively, by organizing and administrating transactions internally through peer groups, vertical integration or other forms of internal organizations, this type of collective arrangement might

reduce the transactions costs that occur in spot markets as a result of the above combination of the behavioral and environmental factors.

The above conceptual perspectives are applied in this study of the existence and functioning of local grain markets.⁴ The research employs the Structure-Conduct-Performance paradigm developed by Industrial Organization theorists. While this specific paradigm has a number of shortcomings in addressing the issues of marketing coordination (Shaffer, et al), it is used here to help organize our research and the presentation of the results. A detailed discussion of specific research issues and the relevance of this organizing paradigm for the empirical research are presented in Chapter Five.

3.5 Understanding Farmers' Responses

The introduction of the Household Responsibility System and the opening of commodity markets and other income earning opportunities imply that the results of policy changes have to be based on expectations of how farmers perceive and respond to the changed constraints and incentive structures.

Three sets of information are needed to develop an understanding of farm household's behavioral responses. They are (1) some type of representation of the household objective(s), (2) the natural and economic constraints which can be identified as fixed or external factors beyond the household control, and (3) the household endogenous decision

⁴ Some concepts from Coase's paper, "The Nature of Firms", have recently been applied by Chinese researchers in examining the more macro-level of reform difficulties. See Zhou, et al. (1987)

variables. While the second and third sets of information can be identified through the detailed though sometimes costly process of data collection, the first set of information often has to be postulated. For example, in modeling farm household behavior, several existing behavioral postulates include the profit (or income) maximization, expected utility (or certainty equivalence) maximization, and the safety first principle.

Further complication occurs in that Chinese farm households are producers-cum-consumers; they may supply a significant proportion of the inputs (e.g. family labor, seeds) they use in farming and retain a substantial part of their output for home consumption. Under such circumstances, the separation of the farm household decision-making process into independent firm and consumer components may result in misleading conclusions about farmers' behavior and expected responses to changed incentive structures.

The literature on modeling farm households as producers as well as consumers extends back to the pioneering work of Chayanov on Russian peasants' time allocation between work and leisure and the subsequent exposition by Nakajima and others. A recent documentation of the basic framework and the general approach to farm household models is that of Singh, Squire and Strauss. In this general model, the household is assumed to choose a combination of own-produced and market-purchased commodities and leisure so as to maximize a utility function, subject to a "full income" budget constraint, which in turn consists of three parts: a labor-budget constraint, a cash-income constraint and a production function showing the input-output relations given production technology.

Several key features of this model are worth mentioning. First, the joint determination of farm household production and consumption decisions is treated as a recursive decision. The farm household first maximizes its full income by equating the marginal value-product of each input used in production to its marginal cost and then maximizes utility derived from the maximum full income by equating the marginal utility of each commodity consumed to its marginal cost. Second, production decisions are determined only by technology, quantities of fixed inputs and prices of variable inputs and of outputs. The household's consumption preferences, prices of other consumption goods and income do not affect production decisions. This second feature assumes the existence and well functioning of all markets. For example, by assuming the existence of well-functioning credit markets, the household access to additional cash income from external sources does not affect capital-requiring production decisions. The third feature of the household model is that household consumption decisions are affected not only by commodity prices, but also by household production decisions. The linkage between full-income and production activities is such that changes in production determinants affecting farm profits will change the farm household's full income and subsequently its consumption behavior. For example, an increase in a staple food price will increase the farm profit, which in turn, via the income effect, increases the household's own consumption of that output.

A complete farm household model approach would require detailed information on all lines of farm household production and consumption activities. Lack of complete data precludes a comprehensive application of this model in this study. As a simple application, this study will

utilize this model to explore the farm household behavioral responses in wheat marketing. The description of this exercise is to be presented in Chapter Seven. For now, we give a general identification of possible factors that might affect the households' wheat production, consumption and marketing decisions. This discussion follows the schematic representation in Figure 3.1.

Because the farm household is both a wheat producer and consumer, the marketed surplus is a net residual supply of farm wheat production minus home utilization. Accordingly, factors that enter farm wheat production and home consumption decisions would necessarily determine the outcome of marketed surplus. Although it is difficult to categorize the factors clearly, we hypothesize that the following sets of factors (allowing for some overlapping) are important. They are (1) the overall policy environment (identified as "government policies" and "institutional environment" in figure 3.1), (2) the farm household's own resource availability, access to external resources, and household characteristics, (3) the natural environment and the available production technology, and (4) the household definition of objectives, or how the household acts within the opportunity sets as defined by (1) through (3).

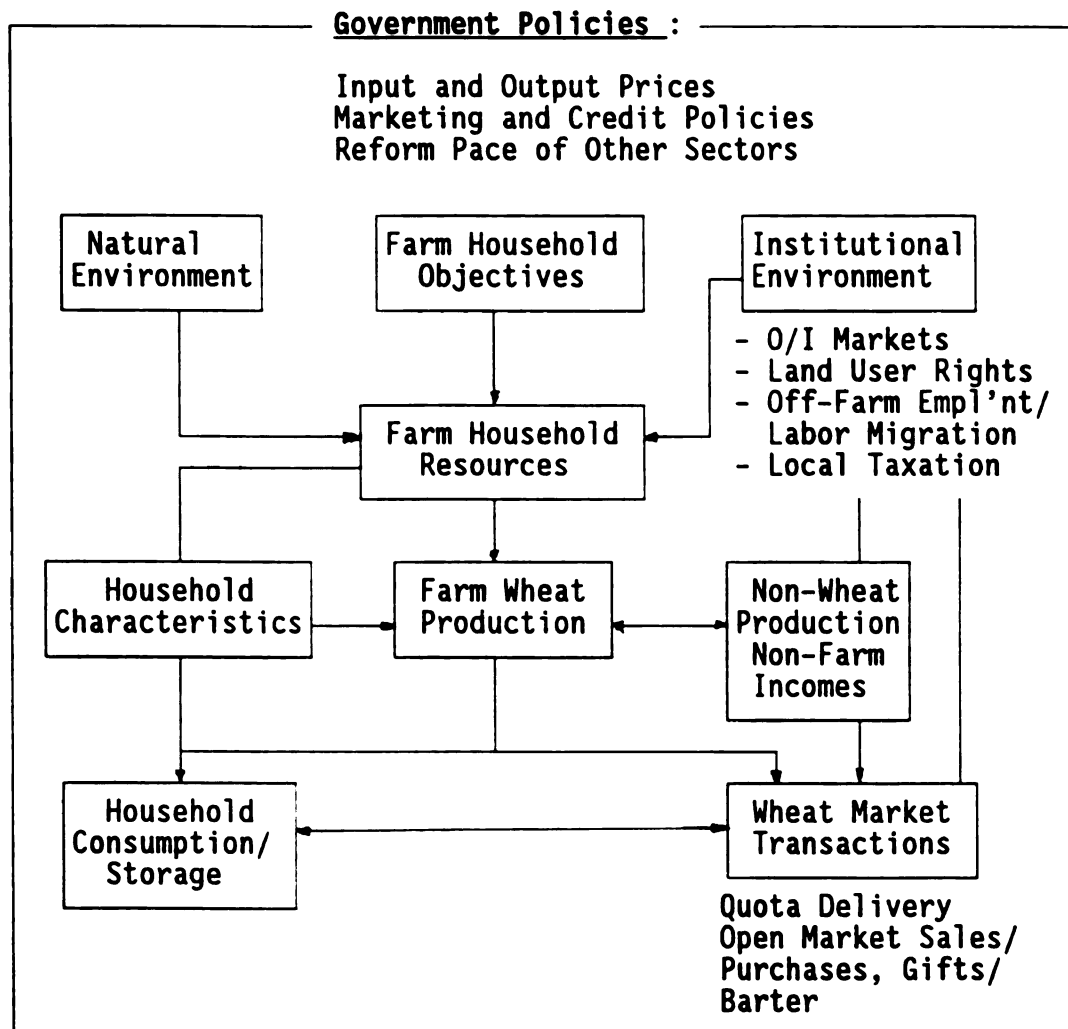


Figure 3.1 A Schematic Representation of Factors Influencing Farm Household's Wheat Production/Transaction/Consumption Decisions

The first component of the overall policy environment refers to the government price policies, the rules on marketing reform progress, and the pace of other sectors' reform progress. The input and output price policies have either a direct effect on the marginal decisions of farm household production and consumption if open market trade is prohibited or an indirect income effect. For example, under the dual marketing system, where quota purchases and open market trade coexist, changes in government quota purchase prices would change household total income, which in turn would affect household consumption decisions. The effects of rules for marketing reform can be seen through the following two cases. A reduction in household sales quota presumably increases the household's net grain availability, hence for some households their home consumption would increase. For other households, their open market trade may increase. A favorable credit policy may work its effect on farm marketing through the traders' consistent involvement in market trade. Finally, the reform pace of other sectors concerns specifically the changes in urban dwellers' rationed food distribution program and the changes in urban household income. An increase in urban household income would generate a high direct and indirect market demand for food-grain, which translates into the derived demand at farm level.

A second component of the policy environment relates to the institutional settings which define the farm household's land use entitlement, output trading and off-farm income earning opportunities, and obligations of local taxation. Land use entitlement defines the farm operational size; output trading settings give rise to the household accessibility to alternative marketing channels; off-farm earning

opportunities such as temporary labor migration increase the household cash income; and the local taxation reduces the household total incomes.

Turning now to the other sets of factors, farm households are entitled to a certain amount of land once the user rights are defined. They also have ownership of such fixed inputs as family workers, farm machinery and large draft animals. Farmers also purchase fertilizer, pesticide and seed. The natural environment factors include the rainfall, natural disasters, pest and insect influence, soil types, etc. All these factors, along with the production technology and price variables, determine household wheat production. On the other hand, the household characteristics, income levels, food grain production, and commodity prices determine wheat consumption and seasonal grain stock management.

Household objectives remain difficult to define. Perhaps a general formulation might assume the household is a constrained utility maximizer, the constraint being that a minimum subsistence level of wheat consumption is required. This representation of the farm household objective function takes the view that the household is concerned with its on-farm food security. Although not empirically established, this assumption is likely, as the households would like to avoid any chance of consumption being below the minimum requirement and since wheat is the main food staple among farmers in the region where this research was conducted. This objective is even more plausible if markets for wheat in rural areas are poor, making it risky to rely on them for one's food supply. Some similar formulations have been employed among the studies in the farm household model literature. For example, Hammer (1986) in his study of Senegalese farm allocation decisions, imposes a food subsistence

consumption constraint directly into the household objective function to examine the implications of an imperfect food marketing system on household resource use in foodgrain and cashcrop production. F. Martin (1988) formulates the household objective function as a multiplication of a usual continuous function and a step function, where the step function is interpreted as the food security concern since it truncates the usual continuous utility function at the minimum food subsistence requirement. Most recently, Gao (1989) also incorporates a household food security constraint into the household net revenue maximization function to explain the semi-subsistence grain producer's market supply response in China.

3.6 Chapter Summary

This chapter presented a conceptual framework emphasizing the role of institutional mechanisms in the development of effectively coordinated grain subsectors. A central hypothesis about China's reform dilemma was that the market-oriented reforms require significant changes in institutions. These institutional changes can provide the legal foundations necessary for a dependable, low risk transaction system.

The chapter maintains that the structure, conduct and performance paradigm developed by industrial organization theorists is useful in organizing the market level research. The purpose of this research is to uncover the opportunities and constraints of private traders operating in local grain markets. Equally important, the empirical findings help to identify the role of the public sector in an effective grain marketing system.

To understand farmers' perceptions toward a modified grain marketing system and the subsequent changes in their behavioral responses, this chapter proposes a farm household model framework that incorporates the key features of agricultural households being both grain producers and consumers. While a detailed discussion of an analytical model of this type is to be presented in Chapter Seven, this chapter presents a schematic representation of sets of variables necessary for the research endeavor. Specifically the discussion delineates four sets of variables. They are (1) the overall policy environment including the government policies and institutional environment; (2) the farm households' own resource availability and access to external resources as well as its household characteristics; (3) the natural environment and the available production technology; and (4) the household definition of objectives. This discussion serves a general guide for the field study and data collection.

CHAPTER IV

FIELD STUDY APPROACHES

4.1 Introduction to the Study Area

A. Choice of the Study Area

Any chosen site for field study in China can hardly be representative of the national picture, as the country is so diverse in resource endowments and socio-economic characteristics and various regions differ in the pace of rural economic reforms. However, a detailed field study is necessary to generate some useful information pertinent to the study area and the research findings can provide a base for comparison with similar studies in other areas. For the reasons to be stated below, I conducted my field research in the Xinxiang municipality located in the north central part of China. See Figure 4.1 for the location of the region. Xinxiang is located in north Henan Province, near the Yellow River. It is connected to major commercial cities through a railway network. Its total population in 1987 was estimated to be 4.37 million, with 85 percent being in agriculture.

Xinxiang was among ten localities selected by the Research Center for Rural Development of the China's State Council (RCRD) in 1987 as pilot sites for policy experiments (see Chapter two). The Xinxiang "experiment" attempts to study the impacts of further adjustments in agricultural

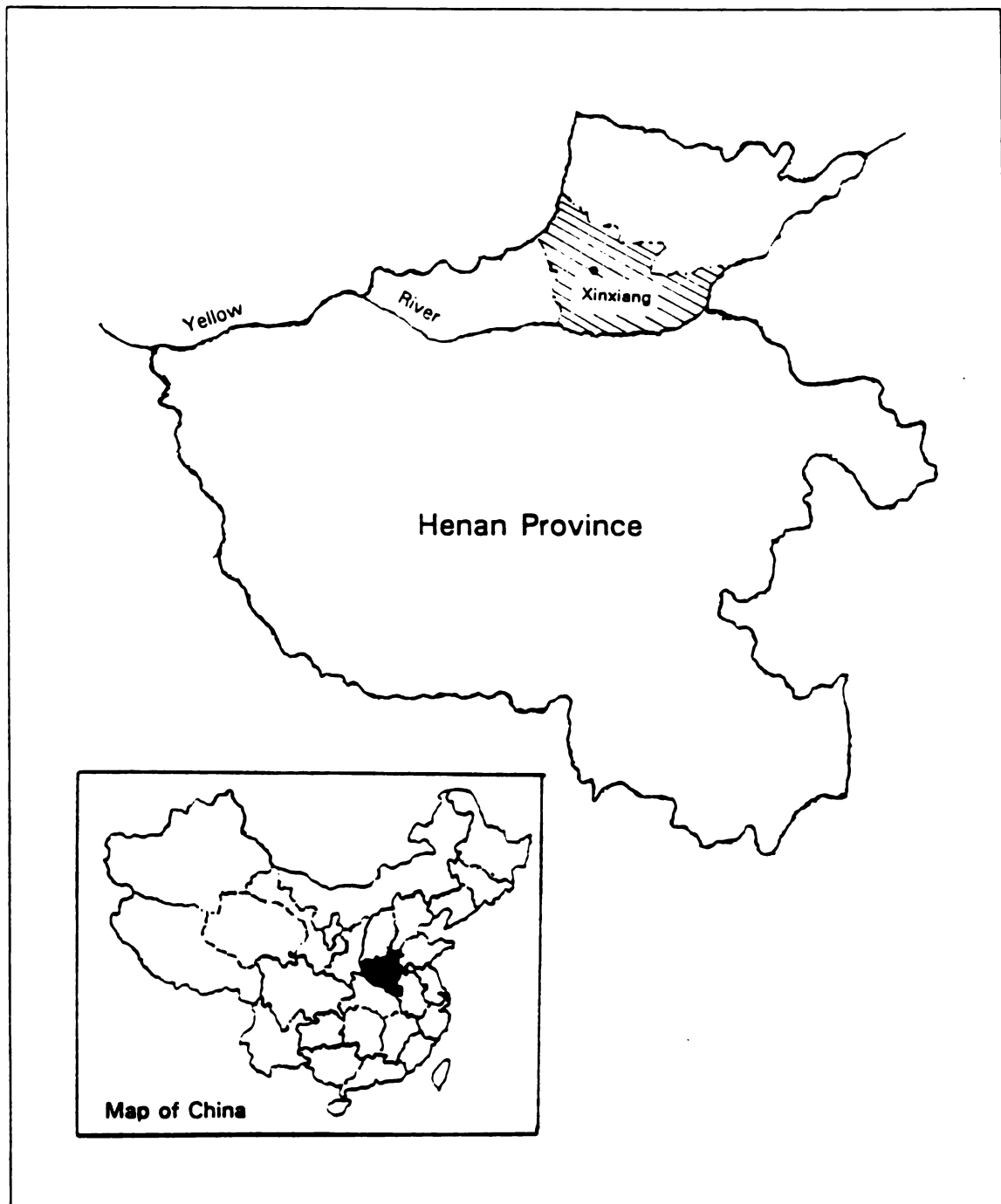


Figure 4.1 Location of Field Research Area in Henan Province, China

pricing and marketing policies. Specific reform measures include (1) raising the state agricultural procurement price close to the market level, (2) eliminating the state subsidy on inputs distributed through official channels, and (3) reassessing land productivity in the agricultural sector and using this information to determine new agricultural tax payments by farmers. Such measures, the policy makers argue, aim at ending price distortions created by state quota purchase and the input subsidy program while moving toward evening out unequal income distributions due to outdated tax schemes (Xinxiang Government, 1988).

According to the RCRD, choosing XinXiang as an experiment site was based on the following strategic considerations. First, the region traditionally is a surplus grain (especially wheat) producing area. As reforms in agricultural pricing and marketing are believed to have strong effects on grain producers and consequently on the mobilization of surplus grain for distribution to urban and rural non-grain producing areas, XinXiang would seem to be an appropriate site for the policy experiment. Second, as the marketing and pricing reforms will extend into urban areas to reduce the ration subsidies, urban residents' perceptions and reactions will be important factors affecting the effectiveness of these further reforms. XinXiang has a small percentage of urban population (estimated at 15 percent of the region's total population). The policy makers believed that the pilot experiment would have smaller impacts on urban consumers and at its best, the experiment of abolishing the urban biased pricing policy will not bring about a large resistance from the urban sector. Finally, another critical factor determining the success of policy reforms is the ability and willingness of the government officials

to implement and monitor the reforms. Having negotiated with the government officials in XinXiang, RCRD believed that the municipal government understood the importance of reforms and were willing to initiate the project.

Prior to my departure for field research in China, I received the terms of my field research support from RCRD's Development Institute in March of 1988. I was informed of the XinXiang "policy experiment". It was suggested that I conduct my field research in Xinxiang in order to complement and supplement other studies by the Institute. It was noted that my study, with emphasis on the farm households and local markets, would contribute to a better understanding of local marketing activities and to the design of other projects and/or wider adoption of the experimental market policies.

B. Geographical Setting of the Study Area

Among the eight counties and one suburban district in Xinxiang, two counties, Yuanyang and Huixian, were selected as the primary base for both market level and farm household survey. This choice was made based upon the following considerations. First, the two counties are predominantly agriculture-oriented. The main crops grown are wheat, corn and rice. Rural marketing activities are thought to be well developed as compared to other counties. Furthermore, these two counties are equipped with farm survey personnel which could provide adequate help for a household survey. Given time and resource constraints, it was believed that empirical research in two counties should generate some useful information for the study.

Yuanyang is 35 kilometers southeast of Xinxiang city proper, and Huixian 30 kilometers northwest. Yuanyang is on the north bank of the Yellow River. Huixian is bound on the northwest by Shangxi province (an upland region historically with low grain production). The two counties have relatively good transportation networks. Intercounty roads have all-weather pavement ready for vehicle transportation, which also connect the county seats to rural towns. These roads usually do not extend into rural villages. Some village roads are unpaved, muddy when it rains, and difficult for vehicle transportation.

Land in Yuanyang is generally level, while in Huixian there are about 55 percent hills and mountains and the remaining 45 percent is a flat plain. Water supply and irrigation infrastructure are important factors affecting crop yields and cropping patterns in the region. Annual rainfall is normally 550 mm in Yuanyang and 640 mm in Huixian, of which 57 percent and 67 percent, respectively, are received in the period from June through August. Crop yields vary across villages as the water supply differs. For the past 30 years the two counties have worked on constructing and maintaining reservoirs and water canals to improve irrigation infrastructure.

The fact that Huixian is located at a higher altitude has made it difficult to conserve the water within the county proper. The underground water level in this county has sharply decreased. Recently the water table level has been at an average depth of 30 meters. Due to limited water supply in Huixian, an increasing amount of arable land previously suited for paddy/rice has been diverted to crops like corn that require less water. Yuanyang is close to the Yellow River, the second

largest interior river in China. Since the 1960s, Yuanyang and its neighboring counties have utilized river water for agricultural irrigation. Over the years, the improved irrigation system provided Yuanyang with a fairly good access to a stable and sufficient water supply for paddy/rice production.

C. Economic Characteristics of the Study Area

A set of socioeconomic indicators for the two counties are summarized in Table 4.1. They refer to the 1986 data available from Xinxiang Municipality Statistics Office. The two counties have about same proportion of the population (estimated at 93 percent) residing in the rural areas. Among the rural population 45 percent and 38 percent of them are in the rural labor force in Huixian and Yuanyang, respectively. A majority of the rural labor force is in the agricultural sector (87 percent in Huixian and 99 percent Yuanyang).

Rural non-farm activities have been limited to "sideline businesses" and off-farm/off-season employment. There are a few rural township and village enterprises, which are either agriculture-related operations, such as agricultural product processing, or local natural resources-oriented activities: excavating and selling sand and other locally available construction materials.

Table 4.1
Basic Statistics of the Study Area

Item	Units	XinXiang	HuiXian	YuanYang
1. Population				
Total	1,000	4,367	641	499
Rural	1,000	3,678	597	466
2. Labor Force				
Rural Total	1,000	1,482	270	177
Rural Non-Agriculture	1,000	107	34	2
3. Rural Economy				
Farm Output Value ^a	million Y	1,236	216	169
Crop Output Value ^a	million Y	901	141	123
Total Cult'd Land	1,000 Mus	5,852	908	817
Total Sown Area	1,000 Mus	9,583	1,535	1,253
Multiple Crop Index	%	164	169	153
4. Grain Production				
Grain Sown Area	1,000 Mus	7,920	1,308	1,077
Share of Total Sown Area	%	83	85	86
Wheat Sown Area	1,000 Mus	3,954	657	510
Corn Sown Area	1,000 Mus	1,923	519	165
Rice Sown Area	1,000 Mus	457	37	190
Grain Output Total	1,000 Tons	1,762	306	262

^a At 1980 constant prices. Total farm output value does not include the output of rural township and village run enterprises.

Source: Xinxiang Municipality Statistics Office, 1987 Yearbook.

Crop production is important not only in terms of rural employment and resource utilization but also in terms of farm incomes in the two counties. Grain production is by far the most significant sub-sector. Approximately 86 percent of sown area is under grains. Given the labor intensive character of Chinese farming technology, a large proportion of rural agricultural labor is employed in producing grain. Grain production accounts for 65 percent of gross agricultural income in the region. Wheat, corn and rice are major grain crops grown in the region. They occupied well over 80 percent of the total grain sown areas in the two counties in 1986. Table 4.2 shows that average yields for the three crops in the study area are consistently higher than the national or provincial averages. If the average yields are considered as a measure of land productivity, the study area in general has an absolute advantage in grain production, especially in wheat.

Table 4.2
Average Grain Yields as in 1986, Kg per mu

	All Grain	Wheat	Corn	Rice Paddy
XinXiang	223	267	205	363
HuiXian	249	273	202	343
YuanYang	243	241	201	428
Henan Province	162	225	155	334
China	183	203	247	356

Source: Data for Huixian, Yuanyang and Xinxiang from Xinxiang Municipality Statistics Office. Data for Henan and China from China's Rural Economy Yearbook, 1987.

D. Cropping Pattern and Choice of Crop Mix

Two crops a year is the common cropping pattern employed by farmers in the region (Table 4.3). Winter and spring crops include wheat and barley while summer and fall crops include corn, rice paddy, soybeans, sorghum, millet, and sweet potatoes. A few cash crops, such as cotton, rapeseed and melons, compete with grain crops for land and inputs. The crop choice for winter and spring is limited, as the weather and climatic condition are only suitable for a few competing crops. Almost all the arable land is devoted to wheat during this season (Table 4.1).

Table 4.3
Production and Harvest Months for Major Grains in Xinxiang

	Planting	Harvest	Marketing
1. Winter and Spring Season:			
Wheat	Oct/Nov	June	June/July
2. Summer and Fall Season:			
Rice Paddy	June/July	October	November
Corn	April/May	September	October

Source: Xinxiang Agricultural Bureau, 1988

Due to overlapping in different crops' growing season, the issue of choosing an adequate crop mix does exist. For example, wheat is usually harvested in late May, while cotton has to be planted in the mid-April. The conflict is usually resolved in two ways: (1) a traditional way is to change the dual cropping into a single cropping, growing only one major crop a year and either leaving the land idle for the rest of year or planting supplementary crops, usually vegetables, which have a shorter growing season, and (2) a modern technique is a mixed cropping, i.e.,

wheat is sown in straight rows, some portion of land between is left unoccupied for late transplantation, say, of cotton seedlings.

On the other hand, choice of the crop mix for summer and fall season is more flexible for the following reasons. First of all, the climate condition in the season is suitable for more varieties of crops to grow. Second, the two major grains, rice and corn, which are grown in this season do not account for any significant part in the farmers' diet in this area. Finally and as will be discussed more in Chapter Five, neither rice nor corn is required for delivery to the state. This is in contrast to wheat, which is the only crop currently under the state quota procurement program in the area. As a result, there are no quantity restrictions externally imposed upon the farm households in their production of rice and corn.

4.2 The Market Level Study

A rapid reconnaissance study was conducted in May of 1988. The purpose of this brief investigation was to review the published documents relating to the grain marketing system and the existing studies by Chinese economists on the marketing reforms, to explore important issues as they were perceived by market participants, to inquire into the availability of relevant secondary data, in particular the price data and data on the state transactions in grain markets, and to examine the existing household data and explore the possibility of selecting a sample of households for the one-shot survey.

A significant result of the reconnaissance study was the development of diagrams of marketing channels for wheat and rice from the farm level to final consumption. See Chapter Five for the diagrams and discussion. Close attention was given to the structure of local assembly markets, namely what role the state and private marketing participants have taken at this level of the marketing system. With this marketing channel diagram in mind, both formal and informal interviews with the selected marketing participants were conducted. Interviews were carried out with a set of pre-structured questions, but no formal questionnaire was used, since the size of the sample for interview was small. All of the interviews were carried out by the researcher.

The grain department officials in the two counties as well as in Xinxiang municipality were interviewed. The questions were grouped into three categories: (1) the current practices of quota procurement and negotiated market purchases; (2) the organizational characteristics of the state grain marketing channel as they were perceived and the changes that have taken place; (3) how these respondents viewed the greater involvement of private marketing agents that has occurred in recent years and how they reacted to this situation. Also at the county grain departments, some detailed records of grain purchases, sales and stocks were collected.

Interviews with the county grain department officials brought out one important issue regarding its relationship with local buying stations and grain processing enterprises, namely, this operational relationship has loosened as the local buying stations began to participate directly in the grain trade with other distant buyers. The researcher then interviewed two local buying station managers in each of the two counties.

The purpose of the interviews was to gain their perceptions of the changing relationships with their bureaucratically superior marketing units (county grain departments). The same type of interviews were conducted with two county wheat flour millers owned by the grain department.

Several open-ended interviews were also conducted with other state marketing agents such as the Rural Supply and Marketing Cooperatives and the state-owned Native Products Trading Companies. These visits were to develop an understanding of how these state marketing agents were involved in local assembly markets and how they established their trading relations with distant buyers. These interviews were conducted only with the county main office managers of these organizations.

The research on private grain marketing participation was carried out in several phases. During the reconnaissance study, several visits were carried out in the retail markets at county seats. Information was gathered regarding where and from whom retailers purchased grains. Then different private grain traders were classified into groups, (1) by their function (retail, wholesale and local assembly); (2) their location (fixed location, petty trader and inter-village large traders), and (3) by their status (licensed and unlicensed). One-shot individual interviews were carried out with a group of 14 private assemblers and wholesalers (some of whom were village millers who also performed these functions). However, no population census of the private traders was made. See Chapter Five for further explanation. Finally to further examine the role of local private grain assemblers, the researcher selected one township in Huixian and interviewed six fixed location traders and three village

level assemblers. Questions include (1) when they started their grain trade business, (2) how they established trading relationship with farmers and with distant buyers, (3) what and how much were the marketing costs involved, (4) how they financed their grain trade and how they obtain price information, and (5) what their concerns were and the difficulties involved in grain trading.

In addition to the interviews with both state and private marketing participants, the researcher interviewed two market regulatory agencies, the County Market Administration Office and the County Price Bureau. Questions included (1) how the price information system was organized and particularly how they collected the market price data, (2) what were the local regulatory decrees regarding the private grain marketing activities and how effective they have been, and (3) what were some specific concerns regarding the grain market regulations, in particular how these different market regulatory agencies operated with each other.

In addition to the interviews with different marketing participants and regulatory agencies, secondary grain market price data were collected from the County Grain Departments, the Market Administration Offices and the Price Bureaus. The monthly price data from the Market Administration Office appear more complete than the other two; they covered about five years, from 1983 to 1988. This price information was used for the later analysis in Chapter Five.

4.3 The Farm Survey

A. Village Selection and Household Sampling

Since the research concerned farmer behavioral response in marketing activities, an attempt was made to select those villages and households whose main economic activities was crop production, especially grain production. The fact that the field study was done by a single individual was the main constraint on the size of the sample. So a modest course had to be adopted of selecting a few villages within each of the two counties, which were believed to be generally suitable for grain production and had in the past produced surplus grain. Furthermore, the villages to be selected were confined to the lower parts of both Huixian and Yuanyang where the grain cultivation is concentrated. On the basis of the percentage of arable land devoted to grain production, per capita grain production, and other factors such as the distance from the nearest periodic markets and from county seats, condition of the roads, it was decided to select eight villages in each county.

Village selection was done with help from the Statistics Bureau personnel in two counties. For this choice, local government officials were consulted on the possibility of conducting a survey in each of the villages. The consultation referred to two factors. The first factor was the distances to villages. The researcher and his assistants could not get easy access to adequate means of transportation. The common means of commute were bicycles and motorbikes. The second factor was the relations between village leaders and farmers. Help was needed from these leaders in organizing the household surveys in the villages. If the leaders were

not willing to offer help or if they had some poor relationship with villagers in the past, it might affect the survey. Having consulted on these matters, a group of 16 villages, eight in each county, was selected. These villages were believed to be representative of major grain producers in the study area. The average size of a village was about 60 households. Ten households were to be selected within for each village. Thus a total sample of 160 households was the target number for the questionnaire survey. The County Government officials were requested to notify village leaders about the forthcoming household survey.

B. Questionnaire Design and Implementation

The household survey was carried out using a structured questionnaire designed to collect relevant information on output, retention, marketed surplus, prices received, quota sales, storage, etc. The researcher designed and wrote out the questionnaire in Chinese. See Appendix A for the English content of the questionnaire. The questionnaire was first reviewed with comments by the research staff of the Rural Market and Price Analysis Group of the RCRD. It was also reviewed by local Statistics Bureau staff for the content and proper usage of local phrases.

The questionnaire was pretested once with four households in each county in July of 1988. Revisions were then made. Major revisions cut some hypothetical questions such as "if the quota procurement was eliminated, how much would you want to sell?", questions that farmers found difficult to answer.

The principal survey team consisted of six agricultural economics graduate students from Beijing People's University. A training program

was set up for them to become familiar with the questionnaire. With the experience in the pretesting, the researcher explained possible issues that might arise with farmers during the survey. A second level of training was conducted with 16 local enumerators with help of the University students. Most local enumerators were accountants. All had some high school education. The survey was done mainly by these enumerators. The tasks for the students and the researcher were to supervise the survey, answer the questions and cross-check the consistency of the survey results while in the field.

The formal survey was conducted in the August, when farmers had relatively "free" time to work through the questionnaire with the hired enumerators. It lasted for two and a half weeks. The survey data were brought back to Beijing and entered in coded SPSS form. The coded data were then checked again to correct data entry errors.

C. Response Rate and Data Quality

The survey was not completed in one village. The enumerator who had been engaged was working outside the village during the time of survey. Due to the distance to the village and the difficulty in locating a vehicle, the researcher did not replace him with another enumerator. Apart from this particular village which the researcher later had to exclude from the sample, all other villages had returned the results within the time frame. The researcher or student assistants lived in the villages for several days until the questionnaire survey was completed. Because of the consistent effort made to supervise the survey, all questionnaires were completed with no apparent "incorrect" answers.

CHAPTER V

THE GRAIN MARKETING SYSTEM IN XINXIANG

This chapter describes and empirically examines the organization and functioning of the grain procurement and marketing system in Xinxiang. While the overall marketing system involves many stages of functional transformation of grain from the farm gate to final consumption, the present study has a primary focus on the local grain assembly level. This level of the grain marketing system serves as an important link in the entire grain marketing chain, and the existence and functioning of local assembly markets have a direct impact on the farm level marketing and production activities.

The chapter has six sections. Section one briefly discusses several key organizational characteristics and the specific policy changes that took place in the quota grain procurement system in Xinxiang. Section two first defines specific study issues within the structure-conduct-performance paradigm and then goes on to describe the existence of free markets and the structural arrangement of market participants. Section three examines how free markets have been functioning. Section four analyzes market price behavior and explores some key factors that have given rise to some special price behavior. The fifth section discusses how the government regulates the markets. And, the final section summarizes the major findings.

5.1 Policy Changes of State Grain Procurement System

The state grain procurement system at the national level has been briefly described in Chapter Two; the organization is a vertically administered hierarchy. In Xinxiang, the municipal grain department is the center of decisions for planning, enforcing and distributing quota grain procurement within the municipal administrative boundaries. Under this administrative center there is one grain bureau for each of the eight counties in the municipality. In each county there are a number of the state-owned township buying stations.

The grain procurement agencies are not free of potential government involvement. A county grain bureau is controlled by the local government. Under this type of institutional arrangement, a grain bureau is accountable to both its superior grain marketing unit and to the government unit which controls it. The strong government influence is typically manifested in the process of grain quota allocations. Government officials participate in the quota allocation meetings and often bargain for a favorable (preferably lower) target allocated to their respective administrative units. The budgetary arrangement is also such that local government has control for providing part of the subsidies, beyond the level allocated by the central government, to cover the financial losses of grain operations. For example, if one county failed to procure enough grain for its quota target and it had to fulfill it by additional purchases in the market, any additional expenses incurred for this purchase would be covered through the local government budget. Grain bureaus and buying stations also need help

from local governments to enforce farmers' delivery of the quota grain. In addition, as a result of the incentive structure within which local officials are judged, they are also interested in the fulfillment of quota targets. While increasing income might have a bigger effect on the farmers' welfare, failure to meet the delivery quotas is more apt to be noticed by high-level officials.¹

The policy changes that took place in the quota grain procurement system in Xinxiang were similar to the national changes. Table 5.1 presents the information on grain procurement and production during 1981 to 1987 in Xinxiang. Note that the figures are not decomposed into the specific grains. The actual procurement as now operated in the area has become crop specific. We will address the impacts of this change later, using the county level aggregate data and the household survey data.

We note in Tables 5.1 and 5.2 that there was a sharp increase in over-quota purchases in 1983 and 1984. The reason for this is that from 1982, nation-wide grain production was rising, while the prices in free markets were trending downward. Increased production and expectations of decreasing market prices induced farmers to increase their sales to the state, probably as the only alternative, since "free market" trade had not yet developed in these years.

¹ See Jean Oi (1989) for a detailed discussion about the state and peasant politics on this issue.

Table 5.1
Evolution of State Quota Grain Procurement Quantity,
1981 - 1987, Xinxiang, million kgs

	1981	1982	1983	1984	1985	1986	1987
Production	1,326	1,446	1,736	1,800	1,627	1,762	1,799
Total Procurement	172	185	394	559	377	263	243
1. Base Quota	69	78	79	70	-	-	-
2. Over-Quota	103	108	316	489	-	-	-
3. Contracted	-	-	-	-	377	263	243 ^a
Total Procurement as % of Production	13	13	23	32	23	15	13

^a The 1987 purchase was the planned target. Actual purchase quantity was not available at the time of field research.

Source: Xinxiang Grain Department, 1988.

Table 5.2
Wheat Prices: State Procurement and Market Prices
in Yuanyang, 1981 - 1988, yuan/kg

Year	Base Quota	Over-Quota	Contract	Market
1981	0.336	0.504	-	0.61
1982	0.336	0.504	-	0.58
1983	0.336	0.504	-	0.53
1984	0.336	0.504	-	0.46
1985	-	-	0.456	0.42
1986	-	-	0.456	0.54
1987	-	-	0.490	0.58
1988	-	-	0.564	0.68

Source: Yuanyang Grain Bureau, 1988

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The contract purchase system was instituted by the government in 1985 to overcome two shortcomings of the pre-1985 procurement system. First, the increase in over-quota purchases had begun to pressure the state budget. The immediate effect of the contract purchase policy was to maintain an upper limit on farmers' sales to the state. Second, as market prices decreased, the gap between the state procurement prices and the market prices was declining (Table 5.2). The policy makers believed that it was an opportune time to align official producer prices with market prices, which would lead to better resource allocation in the agricultural sector. The contract price was adjusted to be a blend price of 30 percent of the quota price and 70 percent of over-quota price. This new price was evidently lower than the over-quota price, though at the time it was close to the market price.

Since 1985, market prices began to rise and the gap between the contract and market prices widened again. At the same time, the grain production nationwide dropped by an unexpected amount. These combined results again made the state quota procurement difficult. To mitigate the problem, the government employed the following means: (1) A political campaign was initiated by the central government in late 1985, stipulating strict enforcement of contract fulfillment. The local government officials and village leaders visited each household to persuade and even harass farmers to complete the contract delivery. (2) The state purchase price was raised. For 1987, the contract price was increased from 0.46 yuan per kg to 0.49 yuan per kg and was further increased to 0.56 yuan per kg in the early part of 1988. (3) An incentive program called "Three Linkage Policy" was introduced whereby

access to subsidized farm inputs was linked to delivery of the grain contract quota. For example, in 1986, the "three-linkage" program included 10 kgs of nitrogen fertilizer for every 100 kgs of quota grain; 5 kgs of diesel fuel for every 100 kgs of quota grain; and other inputs such as plastic sheeting. And, finally, the grain procurement target was reduced for the later years. In Xinxiang, grain procurement target was 420 million kgs in 1985, 285 million kgs in 1986, and 243 million kgs in 1987. Correspondingly, a portion of the rationed grain sales (known as the bonus sales to cotton and pig producers for their sales of the respective products to the state) was reduced, although the ration distribution for urban consumption remained. In response to the reduction in the grain procurement target, Xinxiang municipality has further modified the procurement system since 1985. A most notable feature of the modification was that the department reduced crop coverage of procurement (Table 5.3).

Table 5.3
Changes in Coverage of State Procurement
by Types of Grain, Xinxiang, 1985 - 88

Time Period	State Quota Procurement
Prior to 1985	Wheat, Corn, Rice, Soybeans
1985 - 87	Wheat, Corn
1988	Wheat

Source: Xinxiang Grain Department, 1988

To see the quantitative significance of this policy change, Table 5.4 shows the evolution of state procurement of three main food grain products relative to the levels of production in Yuanyang during the period of 1981 to 1987. In percentage terms, the state wheat procurement was 15 percent of the production in 1981/82. It reached close to 40 percent in 1984/85. In 1986/1987 the procurement was 27 percent. On the other hand, procurement of corn and paddy rice was reduced to only a relatively small amount or was eliminated entirely from state procurement by 1987.

Table 5.4
Production and State Purchase of Wheat, Corn and Rice
in YuanYang, 1981 - 87, million kgs^a

Items	1981	1982	1983	1984	1985	1986	1987
Wheat							
Production	96	106	186	124	111	123	178
State Quota	15	15	36	48	42	32	35
Purchase							
% Share	16	14	27	39	37	26	27
Corn							
Production	38	35	40	33	34	33	36
State Quota	4	6	11	9	4	2	3
Purchase							
% Share	10	16	28	28	10	5	7
Rice^b							
Production	31	43	57	52	54	57	60
State Quota	3	3	4	38	9	0	0
Purchase							
% Share	8	7	7	76	17	0	0

^a State purchase does not include state negotiated purchase.

^b Ratio of milled rice to paddy is assumed to be 70 percent.

Source: Xinxiang Grain Department, 1988.

According to officials of the Xinxiang government and the grain departments, the decision to withdraw some grains from the state procurement was due mainly to state budgetary limitations. The leaders at the Xinxiang Grain Department revealed that the Department decided to eliminate the rice purchase mainly because it was unable to buy the target quantity unless the state price was raised to the market level. However, increasing the official purchase price would raise the budget expenditure, since the state continued to keep the consumer price low. Secondly, the recent policy modification toward crop specific procurement also reflects two other motivations of the local government and their grain departments. Since wheat is the main food staple for the local residents, to meet the local demand for a sufficient and stable supply would avoid the political discontent of local consumer groups. Wheat is also one of few crops that grow during the winter/spring season. In addition, grain market prices are higher than the state procurement price, much more so for corn and rice, so grain departments have had to rely on local administrative efforts to either foreclose free market transactions for certain days or force farmers to sell to the state. Concentrating only on wheat procurement reduces transaction costs by local governments and their grain departments during the procurement campaign.

As the state procurement is mainly for the purpose of maintaining the rationed grain distribution, and because the ration price has been kept low and unchanged, the effects of procurement policy changes are directly translated into changes in the state budget expenditures in grain marketing (Table 5.5).

Table 5.5
Subsidy Expenditure for Grain and Oil Procurement and
Distribution in Xinxiang, 1981 - 1987, 10,000 yuan

	1981	1982	1983	1984	1985	1986	1987
Total Subsidy	5607	6001	7523	11232	8963	7896	5690
of which:							
Procurement expenses	2052	2197	4506	7900	6202	5047	2984
Marketing costs	2205	2267	1598	1899	1506	1543	1360
Rationed Sale Losses	1350	1537	1419	1433	1255	1306	1346

Source: Xinxiang Grain Department, 1988

Before interpreting the data in Table 5.5, an explanation of the subsidy categories is in order. The procurement expenditures measure the value differences between the base quota price and over-quota prices, evaluated at over-quota procurement quantity. In terms of the state financial accounts, this expenditure measures the "extra" payment to producers for the total quota quantity procured. Marketing costs are the subsidy allowances during the grain and oil marketing process, including such activities as milling, handling, and transportation. The rationed sale losses account for the value difference between the consumer ration price of grains and the base quota price, evaluated at the quantity of rationed distribution to the consumers in the region.

The total subsidy expenditure for state grain and oil procurement and distribution almost doubled between 1981 and 1984. The most significant increase occurred for grain procurement expenses, which were nearly four times greater in 1984 than in 1981. As was seen in Table

5.2, the over-quota price in 1984 was higher than the market price and in effect acted as a support price. This high premium price in 1984 induced farmers to produce more and to sell more to the state. During the next four years between 1984 and 1987, total subsidy expenses were reduced by about 50 percent, the absolute amount being about the same as that in 1981. Once again, much of this reduction was due to the cut-back in the procurement subsidy.

The reduction of budgetary expenditures for grain and edible oils procurement was an important factor underlying the 1986-1987 changes in state grain procurement policies. However, this change would likely have some significant consequences on farm producers and on the grain marketing system, which could not be ignored in the context of grain marketing policy analysis. First, since the current quota procurement is crop specific and the difference between the state and market prices is widening, such quota delivery constitutes a price discrimination against wheat production. The extent that this type of quota delivery program affects farmers' wheat production and marketing behavior will be the subject of the next two chapters. Second, as the reduction in total procurement of quota grain declines, farmers will make their surplus grain sales in other marketing channels. It is important to realize that enlarging the scope of market coordination in grain marketing activities is far more complex than simply for the state procurement system to cease operation. Obviously such a retreat offers little promise for expansion of transaction opportunities in the absence of alternative mechanisms. The central issues include; to what extent can and do alternative channels exist and how effectively do they facilitate

grain marketing by farm households? The rest of this chapter addresses such issues in the case of Xinxiang.

5.2 The Existence and Functioning of Free Market Trade

A. Specific Study Issues Within a Conceptual Approach

The description of the existence and functioning of free markets at the local grain assembly level focuses on a set of specific issues: (1) What were the marketing outlets available at local assembly levels by 1988 and who was providing the assembly services? (2) What were the structural characteristics of the local assembly markets? (3) What was the estimated volume of grain transacted through the local assembly market? (4) Did different market participants provide timely assembly and transport services? (5) How did they finance these activities? (6) What were the mechanisms for connecting local grain assembly with wholesale and retail demand? (7) How did traders deal with the risks and instability occurring in their marketing activities? (8) How was market information system organized? (9) How did grain prices differ seasonally and across regions? (10) What were the characteristics of government involvement in the free market activities?

This set of questions was raised within the framework of the market structure, conduct, and performance paradigm, an approach developed by industrial organization theorists (e.g. Bain, Scherer) and modified to apply in the context of the developing countries (Riley and Weber 1983). This approach "...focuses on the relationship of structural characteristics of markets, a limited set of behavioral responses, and a

limited number of performance measures--usually efficiency, progressiveness, and equity." (Shaffer et al, 1983) This paradigm holds that the structure of a market strongly influences the competitive conduct of firms within the market, which in turn strongly influences market performance. The relevance of this approach for the present study of local assembly markets is that it helps us describe and diagnose the most salient aspects of market structure, conduct, and performance that are fundamental in affecting the coordination of marketing activities.

Recent policy changes toward market liberalization have brought into play the increased role of market coordination in China. Watson (1988) observes, "The free market began to act as an engine of economic change, shaping both the structure of agricultural production and employment and the network of new economic linkages through the emerging hierarchy of market centers" (p. 1). But, one can not ignore that free market activities have frequently been prohibited or strictly controlled by the state. "Market liberalization" is not only a move away from state control and policing of trade and commodity flows (by reduction of administrative determination of prices and a contraction in the role of state marketing institutions), but also to build effective measures to provide more favorable conditions for private sector initiatives. Several recent studies of the market reform experience since 1979 have shared a common view that the China's free markets are still underdeveloped and are experiencing severe instability. In his study of the market mechanisms in the distribution of industrial products in China since 1979, William Byrd (1987) points out that although the

distribution through market mechanisms has increased rapidly in the post-reform period, the markets remain relatively "thin" and that they are weak, fragmented, and vulnerable to administrative intervention. Watson (1988) notes in particular that there have been recurrent conflicts between "the economic boundary" and "the administrative boundary" in terms of the inter-regional movement of agricultural products. Specific to the grain marketing system, other authors have expressed somewhat pessimistic views. For example, Oi (1986) observes that "...the reform and resurgence of markets in rural China have indeed given more freedom, but at the same time peasants face greater uncertainty. The abolition of the state monopoly over the purchase and sale of grain lifted the burden of forced quotas, but it also removed the secure income offered by unified purchase." (p. 289) Others suspect that the reappearance of private traders may have opened the way to every sort of speculation, to the disadvantage of those at the bottom of the ladder (e.g. Aubert). Perhaps a more vivid description of the "reform dilemma" is the phrase frequently cited by the Chinese researchers -- "We tighten, and get inertia; We relax, and get chaos." (Gao and Zhou) (1988)

Therefore, it is of a critical importance that the above descriptive and diagnostic observations and conjectures be further examined by uncovering the opportunities and constraints in local grain assembly markets that are emerging in response to the new policies.

B. The Existence of Local Assembly Markets

The empirical information presented is derived from interviews with traders and farmers, direct observations in different markets, and one case study in a rural township. However, it should be pointed out that the period when the field studies were conducted was somehow "clouded" with an anti-private marketing atmosphere. For example, in the first market level study in June and July of 1988, the "free market" was officially closed for three weeks in order to guarantee the fulfillment of wheat contract deliveries. In the second traders' study in October and November, private traders were officially prohibited from purchasing corn and rice from farmers in order to avoid the so-called "market disruption in other areas, created by the inter-regional grain movement by private traders." It was observed that some private traders were still covertly in operation, consequently some problems were encountered in the traders' interview process. For example, several traders did not want to be interviewed and others were reluctant to reveal their actual trading volumes and business profits. As a result, much of the information presented refers to what had occurred in 1987 and the early 1988 period.

B.1 Status of Supply and Derived Demand at Assembly Markets

While it is difficult to make quantitative estimates, some qualitative information can be presented regarding the status of surplus grain supply and derived demand at the local assembly markets in Xinxiang. On the supply side, the potential "free market" supply of wheat is total production net of home consumption and the state quota

delivery. For example, the farm survey data (mainly from the grain producers) indicated that the total marketable surplus was about 55 percent of the production in 1987, of which 47 percent was under the quota target, and the remaining 53 percent was sold through the local "free market" assembly channels. As both rice and corn had been excluded from the quota procurement program, presumably all of the marketable surplus was being sold through the local assembly channels. The rice marketable surplus was estimated to be about 60 percent of production and the corn marketable surplus was about 53 percent of production in that year.

The derived demand for foodgrain at the local assembly level comes from different origins. The first is the local direct consumption and commercial utilization. A Xinxian urban survey showed that in 1987 the urban dwellers purchased 94 percent of their "coarse grain" and 15 percent of their "fine grain" from the free markets.² The local free market demand was supplied by private retailers who in turn purchased from rural local assembly markets. Local commercial utilization refers to purchases by the increasing number of private catering services and restaurants.

The second origin of derived demand is the purchase by buyers from outside of Xinxian. Wholesalers from Liaolin, Beijing, Shaanxi and Jinin (northern China) purchase wheat and rice, and those from Shanghai, Guangdong and Sichuan (South and Southwestern China) purchase corn. In addition to these more distant buyers, there are buyers from the

² Coarse grain refers to corn and barley; fine grain refers to wheat flour and milled rice.

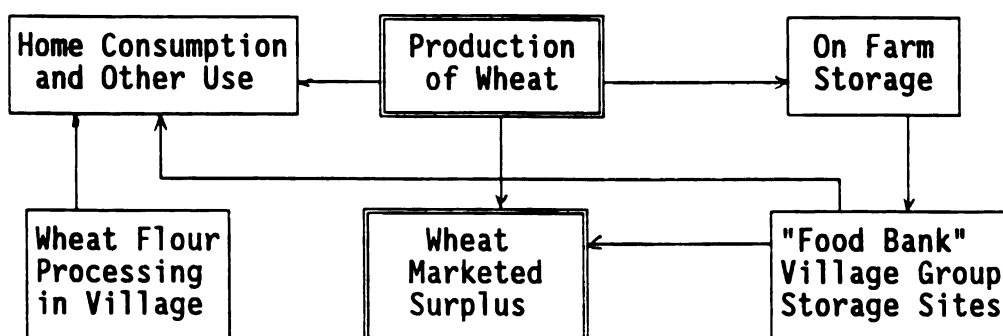
vicinity of Xinxiang (e.g. Zhenzhou, Nauyang) who also purchase wheat and rice. Also, many state-owned enterprises dispatched their personnel to the rural area to purchase milled rice which was to be distributed among employees as annual fringe benefits.

B.2 Grain Marketing Outlets at the Local Assembly Level

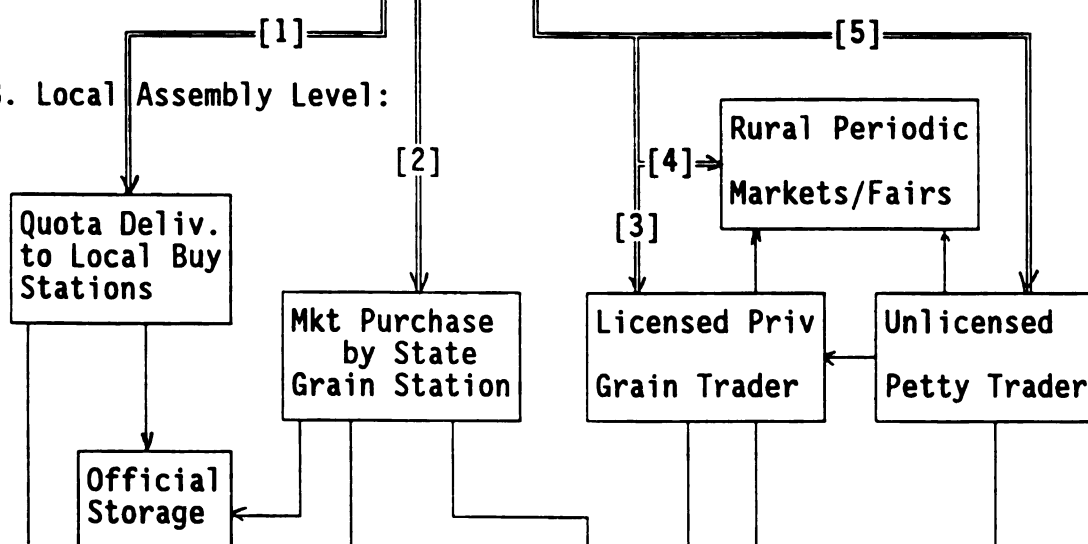
The marketing channels for wheat and paddy rice are presented in Figures 5.1 and 5.2, respectively. A number of marketing sub-chains can be identified for the physical flow of surplus grain from the farm level to final consumers. The channels as shown refer primarily to the grain marketing outlets available to producers and the participating traders at the local assembly level. Note that in Figure 5.1 we did not explicitly show the wheat milling establishments. In fact the wheat flour mills were spread over different levels of marketing channels, including the village level small mills, privately and cooperatively run wheat mills beyond the local assembly levels, and the state-owned medium and large size mills. The following materials will briefly describe each of these subchannels as well as its relative importance from the perspective of farmers' grain marketing.

State Buying Station: Although recent grain marketing reforms abolished the mandate of the state monopolized purchase, state grain purchase agencies remain in operation. A grain buying station is located in each township seat. This marketing outlet receives the wheat quota deliveries and makes market purchases of non-quota wheat and other grain surplus. Farmers and local traders transport surplus grain to sell at the stations.

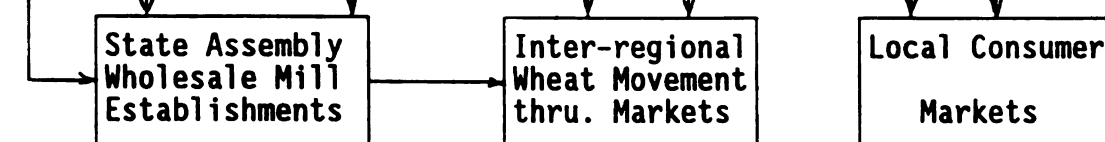
A. At the Farm Level:



B. Local Assembly Level:



C. Beyond Local Marketing Outlets



D. Consumer Groups

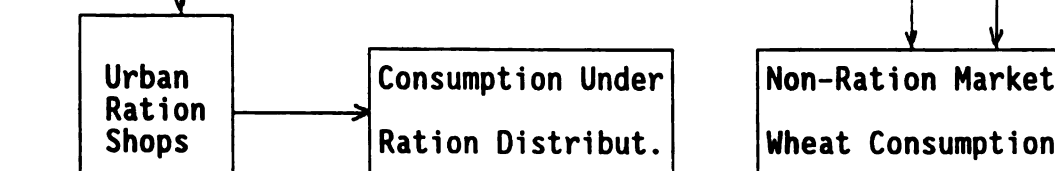
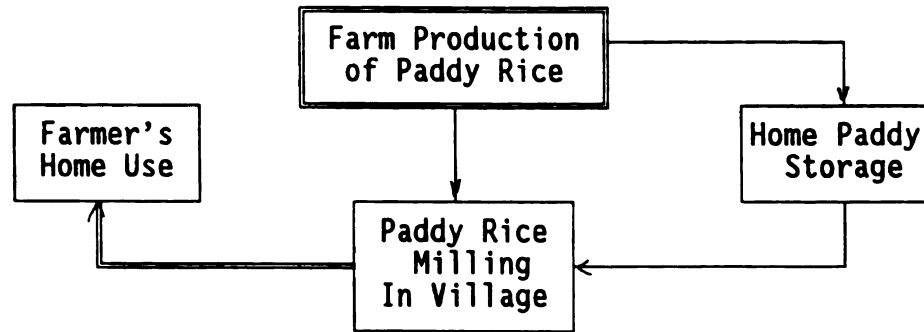
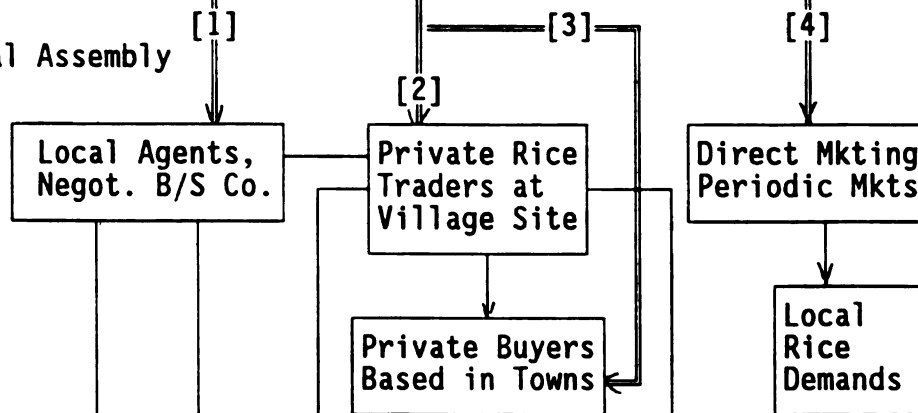


Figure 5.1 Wheat Marketing Channels in Xinxiang, with particular reference to outlets at local/village level, 1988

A. At the Farm Level:



B. At Local Assembly



C. At the County Wholesale Assembly

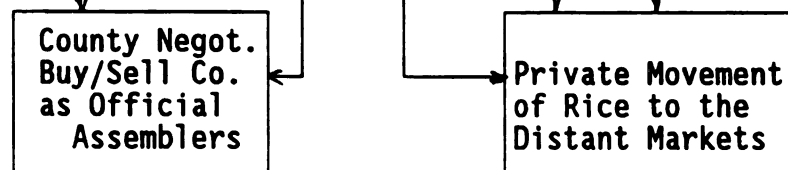


Figure 5.2 Rice Marketing Channels in Xinxiang, with particular reference to outlets at local assembly level, 1988

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Rural periodic market fairs: They are the traditional places for rural residents to sell their surplus farm products and buy daily consumption items. These periodic markets exist in every rural town seat. Each county seat town also holds a periodic market fair on a larger scale and they are usually scheduled at ten-day intervals. Markets in different locations operate on different days as a convenience to sellers and buyers. Thus, assemblers can go to different rural markets on different dates to collect grain marketed by farmers.

Village Level Assembly: Parallel to the rural periodic markets, village level assembly is another type of marketing outlet. This assembly outlet emerges due to the following factors. In most villages there are several small private grain mills. After the grain is harvested, villagers usually put the grain in bags at the miller's place. Millers therefore not only will process the grain but also will arrange for grain sales. This practice was observed mostly for paddy rice. In addition, farmers in the study area (especially in Huixian) were accustomed to storing wheat in group storage places. The group storage acts principally like a "food bank". It provides farmers with the storage space and flexible liquidation. Whenever they want the grain for home consumption farmers go to the "food bank" to withdraw it from their account. During the period of storage, the managers can sell and buy back, profiting from seasonal and regional price differentials. Farmers may share the profits as dividends to their deposit, but losses can be a problem.

In fact the village group storage establishments have recently been in a viability crisis. During 1984 and early 1985 when wheat prices

were falling, many storage managers seized this opportunity and sold most of the wheat in storage, expecting that they could buy back at even lower prices. Most of the sales to outside buyers were often made on the basis of delayed payments from the buyers. No formal contracts were signed. However, during the 1986 and 1987 crop years, market prices were consistently increasing. As this occurred, storage managers could not afford to buy back enough grain to honor farmer's withdrawal for home consumption. Buyers later did not honor the informal contracts for delayed payment. As a result, a number of the storage establishments have gone bankrupt. In Huixian, for example, the County Bureau of Rural Township and Village Enterprises reported that out of approximately 120 village storage establishments, 70 were insolvent by 1987.

In addition to the drastic changes in market condition, the crisis of village group storage establishments is also related to problems associated with their reorganization. Previously the village group storage was run collectively by the communes. After the dismantling of the commune system, the group storage facilities were subcontracted to private managers. No formal documents were written or agreed upon for the subcontracts. Furthermore, no farmer member representatives were elected to supervise the storage and the activities in grain buying and selling. This lack of an institutionalized arrangement likely led to bad performance, as private managers were not responsible to anyone.

Rural Supply and Marketing Cooperatives: They are parastatal enterprises. Their organization is similar to the state grain procurement system. In each rural township the cooperatives have their local stations. Their role in the grain marketing system is peculiar in

that they mainly purchase corn for feedgrain distribution, though they may infrequently purchase small amounts of wheat and rice. Due to their limited participation in wheat and rice marketing, they are not shown in Figures 5.1 and 5.2.

Relative Importance of Alternative Marketing Outlets: The investigation of the periodic markets indicates that their role as the first assembly site for surplus grain is relatively weak. Farmers come to periodic markets to purchase groceries while their marketings are largely some specialty and livestock products. Their sales in these markets also include some foodgrain and quality grain for seeds. This phenomenon was observed particularly in the rural township seat markets. In the county seat markets, we observed that farmers were selling relatively large volumes of grain, ranging from one to five bags (one bag weighs about 40 kgs). The share of grain (wheat, rice and corn) marketed in the periodic markets varied considerably from one percent for rice to 16 percent for wheat and 34 percent for corn (Table 5.6).

Table 5.6
Percent Share of Marketed Grains by Marketing Outlets
Excluding the State Quota, by Sample Households
Who Sold in 1987/88 Marketing Season

Crop Type	Average Sale per yr per HH	State Buying Station	Village Assembly Traders	Periodic Markets
	kgs	-----	Percent Share	-----
Wheat	963	17	67	16
Corn	1210	13	53	34
Rice	1602	3	96	1

Source: Farm Survey

Further analysis indicated that those who did sell their surplus in the periodic markets reported that only small lots were sold (see Chapter Six on wheat sales). The main reasons for selling in the periodic markets were: (1) direct sales in the markets were considered to be "equal exchange" due to competition among different buyers and sellers (57 percent of the sample farmers listed this the most important factor); (2) the periodic market was the main source of price information (17 percent of the sample so responded); and (3) farmers sell surplus grain in order to purchase daily groceries in markets (18 percent of the sample).

Less than one fifth of the surplus grain was sold directly by the sample farmers to the state buying stations. Travel distance to state buying stations and the increased competition by non-state grain traders at the village level were among the factors why the state buying stations were not considered as an attractive marketing outlet.

The amount of surplus grain sold to village located buyers was very significant. The sample farmers reported that in 1987/88 on the average, about 67 percent of wheat, 96 percent of rice and 53 percent of corn was sold to village buyers. Main reasons listed by farmers who sold at the village sites included: (1) the village assembly was most convenient in that farmers did not have to transport surplus grain to township centers (57 percent of the sample agreed with this response); (2) farmers also saw this type of marketing outlet less strict in terms of grading standards than the state buying stations (39 percent of farmers replied with this response).

B.3 Characteristics of Different Assemblers:

B.3.a Official Grain Assembly and Marketing Agency

The state grain department began being involved in the free market (or "Negotiated") trading in the early 1980's. The negotiated buying and selling activities have been closely related to the quota grain program operations, as they are operating within the same institution. The municipal grain department has a "Grain and Edible Oil Negotiated Buying/Selling Center" that administers such activities as assembly, storage, processing, transportation and distribution which are outside of the planned quota procurement. The county level grain bureau includes a "Negotiated Buying and Selling Company", that was to collect market information, provide marketing services, coordinate the grain purchase and distribution, and guide the price setting within a county. A major difference between the municipal center and county company is that the latter acts explicitly as a wholesaler. Actual grain purchase and assembly is performed by the local grain stations. They purchase grain, store it, and wait for transshipment by the county company, or sell directly to prospective buyers.

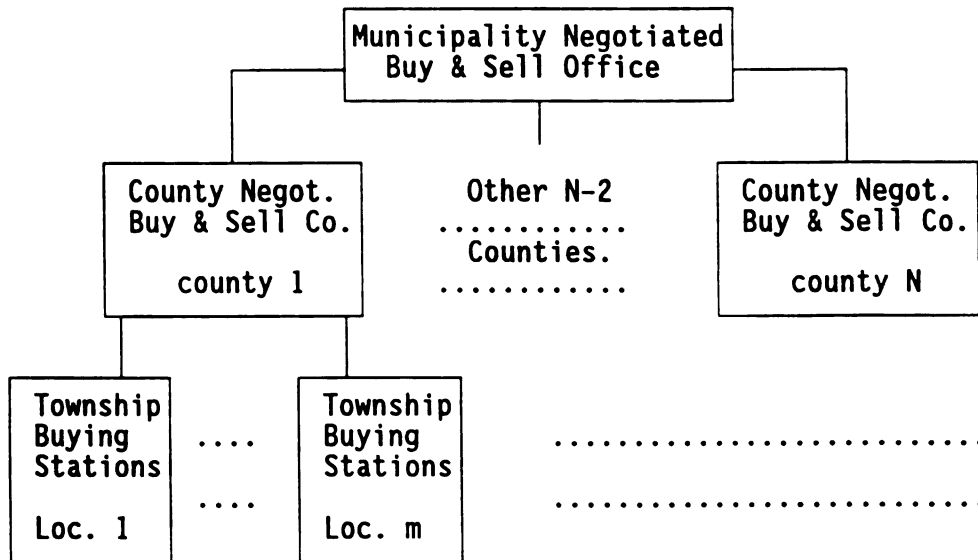


Figure 5.3 Organization of the State Grain and Oil Negotiated Buying and Selling Channels, Xinxiang, 1988

Several specific arrangements have been developed to maintain the organizational hierarchy, although the effectiveness of the arrangements varies. First, the county companies can negotiate purchase orders with distant buyers, while local buying stations were intended to be solely responsible for the local assembly of surplus grain. However, this type of coordination was vulnerable to breakdowns. If local buying stations could directly find more attractive orders themselves, they might bypass the county company and sell the surplus grain themselves. For example, the county company in Yuanyang estimated that about 60 percent of the locally purchased grains was moved out of the county under the county company's negotiated orders, and the remaining 40 percent was arranged directly by local grain stations. Furthermore, changes in credit arrangements also facilitated the break downs. Previously, the

capital for grain purchase was arranged by municipality and county grain departments and allocated internally to local buying stations. Since 1987, except for the quota grain purchasing capital allocated by the city and county grain departments, the working capital needed for other purchases of grain had to be arranged directly by the local stations. In cases where the county grain bureaus cannot make timely shipment of grain, the local buying stations would have to incur the expenses of storage cost and interest charge on the borrowed capital. Direct sales arrangements are an alternative.

The second arrangement for maintaining the hierarchy is for the county company to request the local buying stations to turn over to the county company a definite percent of their annual profits. The company lays out a market purchase plan for the coming year, and estimates the expected returns from the purchases and sales. It then allocates a smaller amount of the returns to the local buying stations. In addition to this fixed share of the profits turn over, additional profits above the pre-assigned amount are prorated: 60 percent goes to the county Company, while local stations retain the remaining 40 percent.

The turn-over of profits from market purchases and sales is instituted for the following reason. The quota grain purchase and distribution program operated by the grain departments is not profitable due to the "inverted" price relationship between the purchase and ration sale prices. The financial losses have been subsidized by the state budget. More recently, the state has fixed the amount of the planned loss on price subsidy and operational shortfalls. It is thought that the budget fixation would help in that the grain department would be

more concerned with its operational performance. Any further loss would be absorbed by the department, any extra savings from the fixed budget would be retained by the department. In the case of further loss, profits from the negotiated operations are used to cross-subsidize the quota branch of operations.

Another important factor underlying the profit-earnings submission relates to the employees' welfare. Employees in the "quota operations" usually would have fewer benefits than those in "negotiated operations", because they happen to be in the "non-profit" generating branch of the business. Since both groups are the same grain bureau, the first group would claim to enjoy as many benefits as the second group does. This obligation on the employee's welfare forces the county Grain Bureau to order profit-earning submissions from the negotiated operations.

Faced with the problem of losing market share at the assembly level, local state buying stations started to dispatch their employees to village-level grain purchasing rather than wait for farmers' delivery at the station. Every employee was required to submit to the station a certain amount of profits from grain marketings. The local stations were no longer responsible for centralized grain sales. In this case, employees had to look for potential buyers themselves.

Parallel to the official grain purchase and marketing hierarchy, there are several types of grain processing, storage, and transportation enterprises. Previously, activity performed by the enterprises was directly aligned with the monopolized grain procurement and distribution system. As the total quantity of quota grain procurement and marketing was reduced, their operations were also subject to change. Specifically,

since their operational capacity for storage and processing, and the number of trucks remain intact, to fully utilize their operational capacity induces them to participate in market purchase and trade.

For example, the Huixian Wheat Flour Milling Plant (affiliated with the Huixian County Grain Bureau) has a daily production capacity of about 4500 kgs in wheat flour. In 1987 it used only one third of its capacity in processing the quota wheat, one third in flour milling entrusted by local farmers, and one third was used to process wheat purchased from the market with the finished product being sold directly either to distant buyers or to local consumers (e.g. private restaurants and bakeries).

While it was possible to obtain wheat from the official grain purchase channel, these grain enterprises often opted to purchase directly from local private assemblers and wholesalers. Perhaps one obvious reason for this practice is that they may want to avoid the "unnecessary" official marketing chain extending from the primary assembly by local buying stations to the county Negotiated Buying and Selling Company. More importantly, as the private assemblers have now been active and competitive in local grain assembly, the local buying stations, due to their fixed location operations, are unable to purchase a sufficient amount of surplus grain to maintain capacity utilization in these grain enterprises.

The tendency for the state grain marketing channel to break down was by no means privatizing the official system because of other persistent linkages such as the quota procurement operation and employment decisions of the hierarchy. Nevertheless, one immediate

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impact of this breaking down was that marketing agents who used to be along different levels within the hierarchy now became competitors with one another, especially in soliciting surplus grain at local assembly markets. The head of Huixian Grain Bureau commented that it was unprecedented that its subsidiaries (i.e. local grain buying stations and grain enterprises) were competing with one another.

B.3.b Private Assemblers and Wholesalers

Classifying Private Market Participants: From villages up to wholesale levels, private marketing participants include (1) village assembly agents, (2) inter-village assemblers and processors, (3) inter-village petty traders conducting barter exchange, (4) rural town-based assemblers and traders. Most of these private marketing participants' major activity is farming, except for the rural town-based traders. Village assembly agents are either small millers or village leaders. As discussed above, small millers take on the role of village level assembly, because farmers usually send their grain to the millers for processing. Village leaders frequently travel on business to township and/or county seats. As such they are most likely to solicit purchase orders from distant buyers. Much of the village level assembly is seasonal and sporadic, depending upon whether there are purchase orders from distant buyers.

The inter-village assembler and processor is mainly based in one village. He often has a medium-sized mill. Farmers in neighboring villages often sell their surplus grain at this outlet. Thus the inter-village assembler and processor assembles and processes the materials

into the finished product (e.g. wheat flour or milled rice) and sells to the distant buyers. Often they also operate a small retail shop in the county seat to solicit marketing orders from potential buyers from outside the region. For example, distant buyers usually come to county seats to locate potential grain surpluses. Local assemblers in remote villages may not be able to obtain these purchase orders because the village may be out of the distant buyers' reach.

Inter-village petty traders are mainly active during the off-season of crop production. They ride bikes or pull two-wheeled carts through villages, to collect surplus grain from villagers and in turn sell to the town-based traders and sometimes also to the state buying stations. Barter exchange is the predominant form of petty traders' business; they transport small lots of minor products such as sweet potatoes to exchange for surplus wheat, rice, or corn.

The township-based traders are more specialized in grain assembly and wholesaling. They are the ones who either used to be local merchants, or recently became traders by returning their farm land user rights (see Chapter Six) to the villages or transferring the rights to their relatives. These township-based traders often operate under some type of partnership, ranging from two to five persons in one business.

Licensing and Number of Assembly Traders Determining the number of traders in the study area was a very difficult task. While the County Market Administration Office keeps a file of the licensed grain traders and assemblers, there are a number of traders that had never had licenses. Regulations of the county Market Administration Office stipulated that any assembler/trader with annual profits of five hundred

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yuans or more was required to obtain a license. Therefore, many petty traders were legally exempt from being licensed.

For the large assembly traders to be licensed requires paying both the licensing fee and taxes on operational gross margins. From the traders' point of view not being licensed implies that their business activity has to be kept unknown to the Market Administration Office in order to avoid being fined. This is possible since the local assembly activities are unorganized and dispersed and licensing enforcement is apparently not stringent. Hence, traders with more than five hundred yuans in profits may not be willing to get the license. There is however an implicit incentive compelling some traders to get licensed "voluntarily". Getting a license means traders can operate openly. This could help them in soliciting potential buyers' orders. As discussed above, setting up a small retail shop in the county seats would help in competing for the potential purchase orders.

The field study focused on one township as a case study to investigate the characteristics of local assemblers and wholesalers. The township selected is located about 25 kilometers southeast of Huixian county and about 19 kilometers west of Xinxiang municipality. It is a major rural township in Huixian in terms of wheat and corn production.

In the township seat, there were ten fixed location grain assemblers and wholesalers. Among them, six were the licensed town-based private assemblers; one was the township-owned wheat flour mill; The remaining three included the local state grain buying station, the local branch of the rural supply and marketing cooperative and the local

branch of state-owned native product purchase corporation. In addition to these fixed location assemblers and wholesalers, about one third of the villages within the township had one or two unlicensed village assembly agents.

A close look at the six licensed private assemblers based in township gives rise to the following observations (Table 5.7). None was specialized in a single product assembly business. They were all engaged in assembling at least two types of grain (wheat and corn). Second, many of them (four out of six) were seasonal assemblers, operating actively during the post-harvest season. These seasonal assemblers also had other businesses such as grocery store-keeping and wheat flour processing. Third, two permanent assemblers appeared to have less working capital than the seasonal assemblers.

This observation needs some clarification. First, as permanent assemblers, they may have established some consistent relationships with wholesalers and distant buyers. As a result, the shorter time of assembly and sales turnover may have reduced the need for working capital. Second, these two assemblers did not have sufficient storage warehouses. They hired private truckers to transport the assembled grain to the distant buyers' place. Third, there was obviously an issue of under-reporting of working capital. For example, in the case of Trader B, the figure in Table 5.7 was taken from his license registration paper. During the interview, he pointed out that up until the time of interview, the distant buyers to whom he shipped grain had delayed paying him in an amount of 20,000 yuan.

Table 5.7
Selected Characteristics of Six Private Grain
Assemblers in Yao-he Township, Huixian

ID	Length Trade	Working Capital	Items of Grain Assembled	Other Business
A	Permanent	yuan 10,000 (7,000) ^{*/}	Wheat, Corn, Soybeans	none
B	Permanent	6,000 (na)	Wheat, Corn	none
C	Seasonal	17,000 (30,000)	Wheat, Corn, Soybeans	Transportation
D	Seasonal	16,000 (20,000)	Corn, Soybeans	Store-Keeping
E	Seasonal	15,000 (30,000)	Wheat, Corn	Wheat Mill
F	Seasonal	15,000 (20,000)	Wheat, Corn,	Store-Keeping

^{*/} Numbers in parenthesis refer to fixed capital values in terms of warehouse, assembly equipments, and means of transportation, measured in yuan.

Source: Traders Case Study, 1988

Farmer Group Marketing Organizations There was virtually no organized farmer group marketing in the study area, even though in a few cases several households pooled their surplus grain and sold along the side of main roads. One observation derived from the farm survey data suggests that farmers have an interest in organizing their own marketing cooperatives, particularly for the purpose of acquiring timely market information and strengthening their bargaining power (about 77 percent of farmers so responded). At the same time, however, factors such as the standardized grading, funds for financing marketing activities, and how to explore market channels rendered group marketing difficult. Also, while the previous marketing activities conducted by village group

storage establishments were more germane to farmer group marketing, their poor performance as discussed earlier might have discouraged the practice of cooperative marketing.

5.3 Functioning of Local Grain Assembly Markets

The earlier discussion of the existence of local grain assembly markets suggests that there are many different types of traders who had begun participating in grain buying and selling. While it is difficult to estimate the exact number of traders involved, it appears that the local assembly markets are not lacking competition. Nevertheless, the number of traders involved is only one of many necessary conditions conducive to market competition and improvement of marketing efficiency. By no means is it a sufficient condition. It is therefore necessary to explore other factors such as the market information system, standards and grades, and formal/informal credit arrangements, which could also have potential impacts on the efficacy of local grain assembly markets.

A. Estimates of Grain Trade Volumes

Three sources of information were used to estimate the volumes passing through free markets. They were the individual interviews of private traders, the historical data on quarterly market arrivals in rural periodic markets, and the records on quarterly grain transactions by the county grain negotiated buying and selling companies.

Traders' Estimates of Grain Shipments: This information refers to only one rural town seat in HuiXian. During the peak season in the

immediate post-harvest period, an assembler will make daily shipments of five to six truck loads (one truck load usually carries about nine metric tons). Working capital required for this volume of trade is estimated at 30 to 40 thousand yuans per day. During the lean season, shipments are made at an interval of every eight to ten days, with a loading quantity equivalent or lower than that during the peak season.

Surplus Grain Arrivals in Periodic Markets: Table 5.8 presents the information on quarterly wheat arrivals at periodic markets in YuanYang during 1984 and 1988. We pointed out earlier that the role of periodic markets as assembly points has been declining as more surplus grains are being sold directly at village levels. The data indicates that while the overall periodic market trade has declined (see the Column "Marketing Year total"), there were changes in the quarterly wheat arrivals. The wheat harvest is in mid-June and most wheat marketings start in July. During the 1984/85 marketing year, most market arrivals occurred in the third and fourth quarters of 1984. During the marketing year of 1985/86, most of the arrivals occurred in the fourth quarter of 1985 and the first quarter of 1986. But this change was not consistent. For example the third quarters' arrivals for 1987/88 were clearly higher than that for other quarters during the same years.

Table 5.8
Quarterly Wheat Market Arrivals in Periodic Markets
in 1984 - 1988, YuanYang, tons.

Year	Quarter				Calendar Year Total	Marketing Year ^{a/}	Mkt Yr Total	% of the County Prod'n
	I	II	III	IV				
1984	155	17	232	450	854			
1985	160	18	61	151	391	84/85	860	1.2
1986	270	524	62	109	965	85/86	1006	1.5
1987	224	74	235	57	590	86/87	469	0.6
1988	23	21	285	na	na	87/88	336	0.3

^{a/} The marketing year starts with the third quarter and ends the second quarter of next year.

Source: Yuanyang County Market Administration Office, 1988; Wheat production is taken from Table 5.4

Possible explanations for the delayed arrivals include the following. First, the majority of wheat surpluses were assembled at the village level and shipped directly to the final users. Village level assembly was concentrated during the immediate post harvest time. However, as the intensity of village level assembly diminished, farmers with additional surplus wheat might have had to sell it in the periodic markets. Although there is no definitive support for this point, direct observations in the periodic markets at different points of time did suggest that this was the case. If this is true, then there exists some kind of functional differentiation between the village level assembly and periodic market sales. A second explanation is that farmers or other traders may have intentionally stored the wheat until the time when market prices became more favorable. Price seasonality analysis

and examination of the sample households' 1987/88 monthly wheat sales suggest that this might be the case.

Records from County Negotiated Grain Buying and Selling companies:

The Company has a record of their purchases, sales, and stocks over several years. Table 5.9 is constructed from that data. The results lead to the following observations. First, as a general trend, the volume traded by this company increased substantially. Faced with the reduced market share, local buying stations have reorganized their assembly activities by dispatching their employees to villages to collect food grains. They may have better access to the commercial ties with the outside buyers, especially those buyers who are their counterparts from the deficit regions. A second observation is that there is an intertemporal linkage among the quantity purchased and sold and in storage. Assembly and purchase are usually made in the second and third quarters when the wheat harvest takes place. Sales are made in the fourth quarter and first quarter of the following year. The ending stocks reflect this temporal difference between purchases and sales. The stocks are replenished until the third quarter, then reduced by the second quarter of the following year.

Table 5.9
County Grain Negotiated Buying and Selling Co.:
Wheat Market Purchases, Sales, and Ending Stocks
by Quarter, in YuanYang, tons

Year Quarter	Purchase (1)	Sales (2)	End Stks (3)	Stk Change (2) as % of (1)+(3)
1985.I	--	395	365	--
II	840	315	890	525
III	595	505	980	90
IV	550	940	590	-390
1986.I	85	375	300	-290
II	355	30	625	325
III	1760	55	2330	1705
IV	1265	769	2830	500
1987.I	0	860	1970	-860
II	1330	1040	2260	290
III	12540	4880	9920	7660
IV	2488	9250	3158	-6762
1988.I	752	1960	1950	-1208
II	9610	2050	9510	7560

Source: Derived from the quarterly sales data provided
by Yuanyang Grain Bureau, Oct. 1988.

B. Seasonal and Dispersed Marketing

Private traders were often seen entering and exiting from the local assembly markets. The number of private traders was clearly much greater during the post-harvest season. It is characteristic that the post harvest marketing and assembly activity was very intense and the increased competition thus framed a strong market picture. The farm survey indicated that while most farmers experienced no difficulty in having access to traders during the post harvest period, the market prices were reportedly difficult to predict. Farmers in several villages

also pointed out that often there were no traders around to purchase beyond the post-harvest period.

During the interview, the County Grain Bureau officials pointed out that this type of market behavior was damaging in that the intensified marketing activity by private traders was often short-lived and sometimes resulted in large fluctuations in market prices. It was cited as an example that in Yuanyang the rice market price was 0.84 yuan per kg in October/November of 1986 and increased rapidly to 1.00 yuan per kg in early 1987. However, immediately after that, the price dropped to below 0.75 yuan per kg.

It would be over-simplification to attribute the price fluctuations in the local assembly markets merely to the frequent entry and exit by the private traders. First, the normal price movements contain an obvious seasonality factor due to the characteristics of grain production and consumption. For an analysis of price seasonality see Section 5.4 of this chapter. It seems more logical that such trader behavior stabilizes prices by increasing demand in the post-harvest period when supplies are greatest followed by decreasing demand as supplies dwindle. Second, the very reason why private trade activity was seasonal has to be examined in the context of factors influencing the way that traders behave. Field research indicates that the determinants of private traders' entry and exit include such factors as the reliability and seasonal distribution of demand from distant buyers, the existence of formal credit arrangements and grain storage facilities. Each of these factors is explained below.

B.1 Dispersed Marketing

The marketable surplus of each farm is small and spatially dispersed. Village assembly is performed by private buyers who either come to villages buying directly from farmers or delegate the collection to village millers or other villagers. Farmers often come to local millers to process their grain for home consumption. A good relationship has long been established among them. Local millers are trusted by villagers. Village level assembly thus provides a vital means of gathering the dispersed and small quantities of surplus grain. As seen in table 5.6, a substantial amount of surplus grain (wheat, rice, and corn) was assembled at the village level.

Perhaps another reason for the prevalent village level assembly and sales is the fact that periodic markets and state buying stations are subject to government restrictions. During the wheat quota delivery period, local periodic markets are usually closed for certain weeks.³ On the other hand, because of its dispersed nature it is difficult to enforce the closure regulation at the village assembly level.

Traders interviewed indicated that their operation is based on whether there is a potential buyer at the other end ready to purchase with timely payment. This is particularly the case with village commissioned assemblers. Because of their limited access to outside markets, their business is mainly dependant on purchase agreements (or informal contracts) from wholesalers and distant buyers. Large private assemblers must constantly look for potential buyers before they start

³ At the time markets are closed, the local state buying stations are also prohibited from any purchases.

grain assembly and this search process usually begins prior to the crop harvest.

B.2 Forms of Traders' Competition and the Price Discovery Process

Different types of competition exist between local traders and assemblers. As most of local grain assembly is in response to the derived demand from distant buyers, price competition among local traders in terms of directly bidding on purchase prices appears to be affected by the process of local traders' negotiation with distant buyers. For example, if the derived demand at the local assembly level is pushing the purchase price higher, local assemblers must quickly inform distant buyers and request sale price adjustments. Local assemblers acting as brokers on a fixed commission payment are most likely to be the winners in this price competition. Local assemblers thus keep in a close contact with distant buyers about any price changes, especially when the price increases.

A more common form of competition is in nonprice arrangements. For example, to increase their market purchase the local assembly points are pushed back closer to farm-gate. Use of still underdeveloped advertising in notifying producers of potential sales outlets is another form of nonprice competition. Sometimes village assemblers post a notice along the road to inform villagers of forthcoming grain purchases or they use loud-speakers to announce the time of assembly.

For dispersed marketing activity such as that observed in the study area price discovery ("the process by which buyers and sellers arrive at specific prices" (Tomek and Robinson p.215)) follows the traditional

and perhaps inefficient forms. Many factors influence the price discovery process. For example, a favorable price may not be received by farmers if an assembler coming to a village site has the information that farmers do not have. If different village trading places are well integrated, that is to say the price information across villages is known to farmers, farmer's bargaining power with assemblers can be strengthened. Such an information flow across villages occurs as farmers discuss the prices in different villages.

Although this informal type of information flow contributes to a better price discovery process and hence the efficiency of market activity, it is greatly subject to human error and can be untimely. Moreover, traders as well as farmers indicated they do not generally have good knowledge of grain prices beyond their immediate markets.

The County Market Administration officials interviewed indicate that they have recently established a mail price information exchange network with more than 100 counterparts in different regions. They collect and send out a local price newsletter and receive similar information from other areas. However, the exchange is not performed on a regular basis. The price collection process is not done at certain fixed observation points, rather it is pooled into a simple average of whatever prices are available from different locations. Finally, although the price newsletters sometimes are posted on the bulletin board outside of the County Office, no systematic procedure is programmed to disseminate prices to township or village levels.

There are at least two more agencies involved in gathering price data. They are the county Price Bureau and the county Grain Bureau.

The price data that the Price Bureau collects are used for the purpose of calculating the price index, although my inspection of their data set reveals that it is very incomplete and they only collect the prices several times a year. There was clearly no concerted effort among these agencies to invest in constructing a better price reporting and disseminating system.

B.3 Credit Arrangements

Private traders reported that they seldom apply for formal loans for their assembly activities. Several traders indicated they borrowed funds from formal banking institutions when they started their business. As the loans were paid off and as their own funds were enlarged, they now rarely relied on formal sources of credit. An alternative source of financing is informal credit offered by prospective buyers in the form of advance payments. Such advances usually account for about half of the value of the buyers' purchase. It is only available if the buyers are anxious to get the purchase. The period of advances is often short and contingent on the purchase being quickly collected and shipped. No explicit interest is charged on the cash advances.

Although the above practice of informal credit exists between the distant buyers and local assemblers, no such practice exists between the local traders and producers. Cash transactions at the time of grain sales is common. However, our interview reveals that farmers may extend credit to assemblers and traders by accepting the deferred payment. For example, during the 1988 Fall marketing season trader B in Table 5.7 issued IOU's in the amount of 10,000 yuan. Such IOU credit by farmers

usually is also short term and limited to producers residing in the same village as the private traders.

There were two formal banking institutions in the study area, the Agricultural Bank and the Industrial and Commerce Bank. During the interview with officials at these two banks, it was found that the Agricultural Bank provides loans to the state grain bureaus, but they have no direct business with private traders. The Industrial and Commerce Bank is supposed to lend to businesses engaged in rural commerce, including the private grain trade. However, the Director of the Industrial and Commerce Bank listed several difficulties in making loans. The Bank's available funds were limited due to the fact that the higher level banks had increased the reserve requirement and also demanded that local banks purchase more state bonds. The interest rate on loans was raised and lending to private grain trade was "risky" because of the previous cases of default, and lending to rural industries was more profitable.

The above discussion of the credit system suggests that the increased access to credit by grain traders could be desirable in order to improve the performance of the grain marketing system. However, there is a more general issue of the reform of the entire financial system in China. Persistent rigidities and difficulties currently facing the financial institutions may be a constraint for them to exercise more responsive credit lines to grain marketing.

C. Trading Relationships

The discussion of local grain assembly markets has indicated that

there are established trading relationships between local assemblers and distant buyers. The field study identified four main kinds of trading relationships, including direct purchases, assembly by commission buying, formal/informal contract purchases, and barter trade.

Direct purchase by distant buyers exists because Xinxiang is well connected to other regions by rail and highway transport infrastructure. Two main highways intersect in Xinxiang. A major north-south national highway passes through the region. The transport infrastructure is also well developed within many rural townships, thanks to the development that occurred under the commune system. Usually a tar-paved, all weather road connects to every township in the two counties in the study area.

Another reason for the direct purchase is that it is necessary for buyers to personally inspect the quality of grain purchased and to negotiate with local sellers on prices. When a distant buyer first comes to a grain surplus area, he visits several villages. During his visits, he investigates the local supply situation, compares the prices in different villages, and discusses the possibility of setting up future "connections" with the local assemblers.

Commission purchase is a dominant trading relation between local traders and distant buyers. Distant buyers usually come to the area to negotiate with a local private trader about the desired amount of grain to be purchased. The buying instructions cover pricing and some consideration for grain quality. In the case of the fixed commission purchase, the private traders will pressure the distant buyers to go along with the "going price" at which grain is being purchased. The distant buyers will request that the commission buyers purchase grain

quickly and ship it to the destination. In so doing, they reduce the risk of possible price changes which may turn out to be unfavorable to the distant buyers. During the negotiation, local traders also demand that distant buyers pre-pay a certain amount of cash to them in order to "initiate" the purchase. This could provide some protection against the possibility that distant buyers will not honor the assemblers' purchase.

A commissioned assembler usually hires private truckers to haul grain to the distant buyers' destination. Often he rides on the truck to prevent any misconduct by private truckers. In case of possible road blockades, he can either bribe the check point personnel into letting the truck pass, or he may pay fines. In the case of local assemblers arranging for transportation the fixed commission includes the compensation determined on a distance tonnage basis. Distant buyers visit with various truckers about the "most likely" hauling expenses from the location to the destination. In the case of distant buyers arranging for transportation, local traders would receive the compensation for handling and some other necessary fees plus the profit, which is usually up to one percent of sales values.

Private traders have many reservations about using formal contracts in long-term trading relationships. The most important reservations concerns price specification. What price should be agreed upon in setting up the contract? Traders suggest that since they are not able to predict the market prices, the "going" market prices would be the only alternative to initiate a purchase contract. Another problem pointed out by local assemblers is that distant buyers sometimes place multiple contracts with local assemblers in different locations, the

amount of contracted purchase placed may be higher than what they actually want to buy. For distant buyers, to do so would provide some kind of safety net. If one placement was not met, he could get the grain from another placement. This behavior by distant buyers could affect local assemblers' position, as the absence or ineffectiveness of the commercial law in protecting the legal status of a contract.

Contract purchases are more common among the state negotiated buying and selling companies. The contract order is nevertheless specified only in terms of the quantity bought and sold. Disputes still occur mainly regarding the pricing arrangement during the lapse of time between the purchase agreement and the final delivery of the assembled grain. Aborted contract agreements also reportedly have occurred among the state buying and selling companies. Multiple placement of selling and buying contracts is one reason for some of them not to be honored later. Disagreement on grain quality is another reason, though in this case the usual solution is for the both parties to inspect the quality in large samples and to then reach some kind of final agreement.

Another factor leading to the abortion of contract agreements is due to the sudden imposition of government market control and inter-regional trade restriction. If the selling party to a trade agreement faces an unexpected trade restriction, the final delivery may not be completed. For example, when the restriction on inter-regional grain movements was reimposed suddenly in the months of October and November in 1988, the Yuanyang County Negotiated Grain Buying and Selling Company held up 750 tons of wheat that could not be delivered to other regions.

Barter trade is the exchange of grain by local traders for other

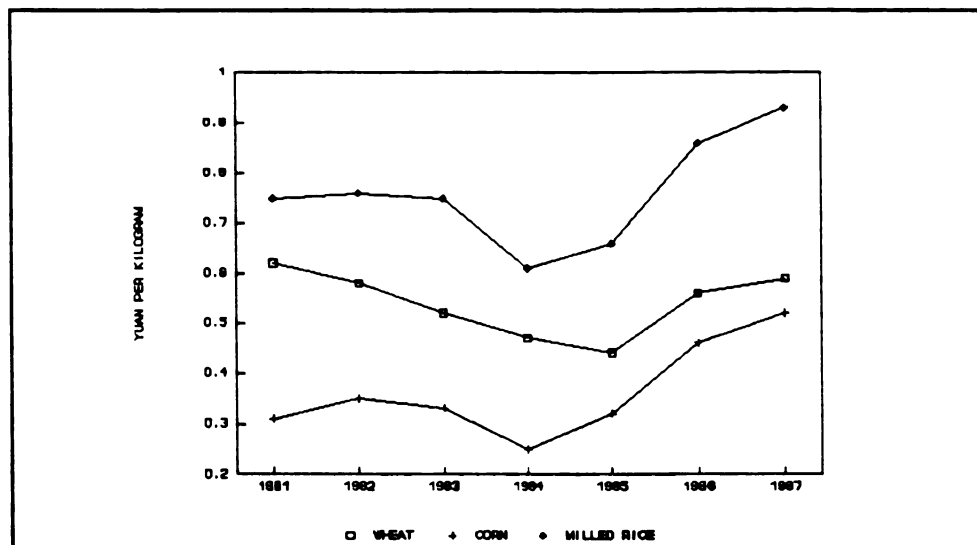
goods in return. Two types of barter trade are observed in the local grain assembly markets. First, rural supply and marketing cooperatives purchase corn from farmers and sell it to a Shanghai feed manufacturing company and request in return a number of "Yian-Jiu" (Forever) or "Feng-Huang" (Phoenix) bicycles, both brands of products being popular among the local consumers. The cooperatives also sell to feed manufacturers in Guangdong or Guangxi and request in return fresh bananas, cane sugar, and electronic appliances. Second, distant buyers from Shaanxi province move truck loads of residential or industrial use coal and barter trade with local private traders for grain (wheat flour).

5.4 Market Price Behavior

This section attempts to address three questions. What factors have contributed to the annual price movements in grain markets? What has been the pattern of seasonal price movements? How well have the different markets been integrated?

A. Factors Influencing Annual Price Movements

Annual market prices for three foodgrains, wheat, corn, and rice during the period 1980 to 1987 (Figure 5.4) first decreased in 1984 and 1985, then increased consistently through 1987. A rapid increase nationwide in grain production from 1981 through 1984 (Table 5.10) led to an increase in marketable surpluses, which depressed market prices. Subsequently, the relatively stagnant production from 1985 to 1987 and continued upward trend in demand tended to pull up market prices.



Source: Xinxiang Grain Department, 1988

Figure 5.4 Annual Grain Price Movements in Xinxiang, 1981 - 1987

Table 5.10
Production of Major Grains in China and Henan province,
1980 to 1987, million tons

Year	Wheat		Rice Paddy		Corn		Total ^{a/}	
	China	Henan	China	Henan	China	Henan	China	Henan
1980	55.21	8.91	139.91	1.78	62.60	5.33	320.55	21.48
1981	59.64	10.84	143.96	2.05	59.21	4.81	325.00	23.14
1982	68.47	12.20	161.60	1.75	60.56	4.37	354.50	22.17
1983	81.39	14.55	168.87	2.18	68.21	6.30	387.30	29.04
1984	87.82	16.53	172.26	2.39	73.41	5.23	407.30	28.93
1985	85.81	15.28	168.57	2.26	63.88	5.37	379.11	27.10
1986	90.04	15.68	172.22	2.06	70.86	4.37	379.11	25.46
1987	87.77	16.26	174.42	1.98	79.82	6.77	404.73	29.48

^{a/} The Total grain also includes other coarse grains and minor crops such as millet, sorghum, and potatoes.

Source: China Agricultural Yearbook, 1982 - 1988 issues

However, to further understand annual price movements, we have to put our analysis in the context of "free markets". In the China's context, the "free market" is in effect a residual market where the forces of supply and demand are allowed to establish the prices for grain in excess of the amount required to meet planned quotas and ration distribution. The following materials try to identify the factors that have caused changes (transitory and permanent) in the excess supply and demand for foodgrain, leading to the observed annual price movements. The fundamental underlying forces for the changes include increases in personal income, structural changes in consumption patterns, progress in urban industrial reforms, and overall changes in economic reform policy itself. While the materials presented tend to have a national focus, inferences are drawn regarding the possible implications for Xinxiang regional grain markets.

A.1 Changes in Government Procurement Policy

As grain production increased rapidly between 1980 and 1984, the central government stipulated that local grain bureaus should procure, at the over-quota purchase price, as much foodgrain as farmers were willing to sell. But matters related to grain management in effect made it difficult for local grain bureaus to do so. One problem is the increased year-end stocks, sometimes exceeding the existing storage capacity. Table 5.11 shows, for example, that in Huixian the year-end wheat storage in 1984 was more than twice that in 1982. The large amount of wheat held in storage tied up the Bureau's working capital and/or banks' credits and occupied the existing storage facilities.

Table 5.11
Wheat Procurement and Year-end Storage of
Huixian Grain Bureau, 1982 - 1986

Year	Procurement (100 tons)	Ending Stocks (100 tons)	As Percent of Procurement
1982	250.8	116.4	46.4
1983	348.9	165.3	47.4
1984	508.3	340.5	67.0
1985	450.4	311.3	69.1
1986	319.1	230.3	72.2

Source: Huixian Grain Bureau, 1988

In order to reduce the large grain stocks, the central government ordered local grain bureaus to sell, at market prices, a portion of the grain procured under the quota system. This policy was called the "diverted sales from quota to market". It was estimated at the national level that in 1984 roughly 85 percent of the negotiated grain sales (a total of 27 million tons) were released from stocks under the quota procurement (Gao, 1989). In Huixian county these "diverted sales" increased dramatically during 1984 and 1985 (Table 5.12). While in 1982 the diverted sales accounted for only 12 percent of the total negotiated sales, by 1985/86 they accounted for more than two thirds.

It is difficult to measure the exact impact the "diverted sales" had on market prices. But, as most of the grain procured during this period was at the over-quota prices and the market prices were already low, it would be expected that the additional "diverted sales" to the free markets would further depress prices.⁴

⁴ Any net loss to the local grain bureaus as a result of these "diverted sales" was compensated by the state budget.

Table 5.12
Changes in the "Diverted Sales" of Grains in Huixian, 1982 -85

Year	Wheat	Rice	Corn	Total	As % of Total Negotiated Grain Sales
	----- metric tons -----				
1982	765	--	--	765	12
1983	205	--	--	205	2
1984	2500	175	2300	4975	71
1985	1335	115	5565	7015	63

Source: Huixian Grain Bureau, 1988

Since 1985 the "diverted sales" have reversed directions. The central government reduced the quantity of quota grain purchased at the state set price, although the level of ration grain distribution did not decrease correspondingly. The balance between quota procurement and ration distribution was met by diverting grains from the "negotiated purchases". It was estimated that at the national level the total quantity diverted from "negotiated purchases" for the purpose of ration distribution exceeded 15 million tons each year since 1986 (Gao, 1989), an amount equal to about 16 percent of the overall retail grain sales of 94 million tons (China Statistics Yearbook, 1988). The diverted sales of such a significant magnitude have likely contributed to the rising grain prices in free markets.

A.2 Increased Market Demand for Foodgrain

Market demand for grain includes both the direct food consumption that partially or entirely depends upon free market purchases, and the indirect use by industry and service sectors such as food processing, feed manufacturing, and catering. Aggregate grain demand has increased during recent years and some fundamental changes have also taken place

in the structure of that demand. A recent study of urban household food consumption patterns in Xiamen, Fujian province of south China showed that about 22 percent of the households (from a sample of 100) did not purchase foodgrains from the state ration shops and instead depend entirely upon market purchases in seeking either better quality or different types of grain products.⁵ In Xinxiang, market purchases of foodgrain in the total quantity consumed by urban dwellers in 1987 were 94 percent for coarse grain and 15 percent for fine grain.⁶

A subtle yet profound substance of the above two examples regarding their effects on the market prices, is the following. The food ration allowances are greater than the quantities that many families actually consume or desire to consume. Hence there are significant quantities of unused ration coupons in the hands of households. In Xinxiang for example, there are accumulated surplus grain coupons with grain equivalent face value of 75 million kilograms in the municipality and about 50 million kilograms in the city itself. In Harbin in north China, by 1988 the city residents were estimated to have accumulated surplus grain coupons equivalent to 120 million kilograms of grain. (Daily Economic Information, August 23, 1988) On the other hand, the government has continued to plan for grain procurement and distribution based upon the previous levels of ration coupon distribution, with some adjustments to the changes in the population eligible for food

⁵ Justin Lin and Cai Fang (1988) "On Grain Policy" Jinji Yengjiu (Economic Research), June.

⁶ The data is from the Xinxiang Urban Household Survey Team. The total sample of households surveyed is 120. Coarse grain refers to corn and barley; fine grain refers to wheat flour and rice.

rationing. This planning therefore fails to consider the dynamics of the urban dwellers' food purchase behavior. The ration distribution compels the government to enforce the fulfillment of the procurement quota and to use the diverted sales from negotiated purchases in order to make up the nominal imbalance between the quota procurement and the planned grain ration distribution.

The rising market demand for direct food consumption has also been due to the increased inflow of rural surplus laborers to the cities. These temporary urban residents are employed in such activities as housing construction, transportation and services. They depend entirely upon open market purchases of foodgrain. A recent report from Guizhou province of southwest China revealed that in 1988 there were roughly 500,000 rural laborers working in several cities in Guizhou who were originally from provinces like Sichuan, Jiangsu, and Zhejiang (People's Daily, Feb. 2, 1989). Another example is that in Beijing, by mid-1987 about 67 percent of the privately employed individuals in the city were rural laborers from other regions (Farmer's Daily, August 10, 1988).

Along with the increase of direct food demand in the market and the changes in urban residents' foodgrain consumption patterns, the industries in food processing, feed manufacturing, and sales of already prepared food also have greatly expanded since 1984/85. Table 5.13 shows that between 1980 and 1988 the privately owned units in prepared food sales have expanded, with rapid expansion occurring after 1984. Their source of inputs, such as foodgrains, relies primarily on open market purchases.

Table 5.13
Number of Units in Prepared Food Sales Service by Ownership
During 1980 - 1988, in 1,000

Year	State-run	Collective	Private	Other	Total
1980	51	83	165	0.2	299
1981	54	109	314	0.1	477
1982	54	125	449	0.2	628
1983	55	118	704	0.1	877
1984	30	148	963	0.3	1141
1985	30	149	1174	0.4	1353
1986	30	145	1244	1.0	1420
1987	30	141	1380	0.4	1551
1988	30	139	1455	0.4	1624

Source: China Statistics Yearbook, 1983 - 1989 issues

Another evidence of the increased demands for indirect food use is foodgrain processing and prepared food sales services provided by rural township and village enterprises or TVEs (Table 5.14). The expansion of prepared food sales by TVEs since 1984/85 may have increased the demand for foodgrains and the drastic increase in foodgrain processing formed another strong force on the demand side. This is significant in the rural grain assembly markets, as these enterprises have a relative advantage of easy access to the foodgrain surplus in the rural areas. Finally, in response to the rising demands for foodgrain products, the number of intermediaries engaged in agricultural marketing and distribution has also increased (Table 5.15). The increase in number of units purchasing agricultural products is most significant for different forms of private marketing intermediaries.

Table 5.14
TVE's Involvement in Prepared Food Sales and Foodgrain
Processing Industry, 1980 - 1987

Year	Units in Catering Services (1000)	Gross Value in Catering Services (bln yuan)	Share in Total TVE Gross Value (percent)	Quantity of Foodgrain Processed (mln tons)
1980	1483	2.344	3.6	50.17
1981	1559	3.166	4.3	48.40
1982	1701	3.735	4.4	51.44
1983	1840	4.709	4.6	52.30
1984	2900	8.080	5.6	64.44
1985	3010	10.980	5.5	46.60
1986	2448	8.755	3.6	152.12
1987	NA	NA	NA	165.53

Source: China Rural Economic Statistical Encyclopedia, 1989 and
China Agricultural Yearbook, 1988

Table 5.15
Units Purchasing Agricultural Products by Ownership
(1,000), 1980 - 1988

Year	State Commerce	S&M Coops	Private	Total
1980	NA	NA	NA	151
1984	NA	NA	NA	177
1985	96	66	59	221
1986	97	67	62	226
1987	99	68	94	261
1988	99	70	95	264

Source: China Statistics Yearbook, 1985 - 1988 issues

A.3 Increase of Interregional Trade

The policy permitting interregional grain movement, particularly the trade through direct marketing arrangements between surplus and deficit regions, has not only increased the quantities of grain moved across regions but also broadened the areas covered (Lardy, 1989). Although detailed information on interregional grain trade is not available, some qualitative evidence on provincial and local grain bureaus' grain trade suggests that trade at "negotiated prices", has increased sharply. In Yuanyang, for example, the county Negotiated Buying and Selling Company experienced a fourfold increase in the negotiated wheat sales outside of the county, from 3,420 tons in 1984 to 13,686 tons in 1987.⁷ Another example of the increased interregional grain trade is the provincial grain department sponsored trade conventions. In November of 1986, for the first time ever, the Henan Provincial Grain Department organized a trade convention. Participants included 560 delegates from other provinces' grain bureaus and food and feed manufacturers. At the convention, Henan alone sold more than 38 million kgs of foodgrain and edible oils for immediate delivery, another 48 million kgs in forward delivery agreements, and still another 55 million kgs sales were settled in tentative agreements.⁸

For a grain surplus region like Xinxiang, the active interregional grain trade increased demand for foodgrain from distant markets and more fundamentally improved market transparency with other areas.

⁷ On the other hand, the County Grain Bureau's quota wheat shipment outside of the county decreased by more than a half, from 8,130 tons in 1984 to 3,543 tons in 1987.

⁸ Henan Economic Yearbook, 1987, p.454

B. Price Seasonality and Effects on Grain Storage

Prices of storable commodities are normally at their lowest at harvest time and tend to rise after harvest, reflecting cost of storage (cost of handling stocks, storage losses, interest on money invested in stocks and equipment). In most cases, prices peak before the next harvest, and may drop as the market liquidates old stocks in preparation for the next harvest. Although the quota grain prices are set and the quantity of grain procured by the state is fixed and obtained during a short period of time after harvest, free market prices tend to be flexible, reflecting seasonal intensity of market supply and demand, and the profitability of grain storage. The seasonal price behavior for three types of grain will be examined and the profitability of grain storage will be discussed briefly. The period covered for this analysis is from 1983 to 1988, a period for which data were available. A seasonal price index was calculated by a 12-month moving average method. Having calculated a 12-month moving average series, the actual nominal prices were divided by the average to derive a monthly "seasonal index". These indexes were then averaged for the same month from 1983 to 1988 to calculate an "average seasonal price index." ⁹

B.1 Results from the Seasonal Analysis

Wheat: The amplitude of seasonality in wheat prices is about 20 percent, that is six percent to eight percent above the average in January and February and ten percent to 12 percent below the average in May and June (Figure 5.5a). The seasonal high and low generally

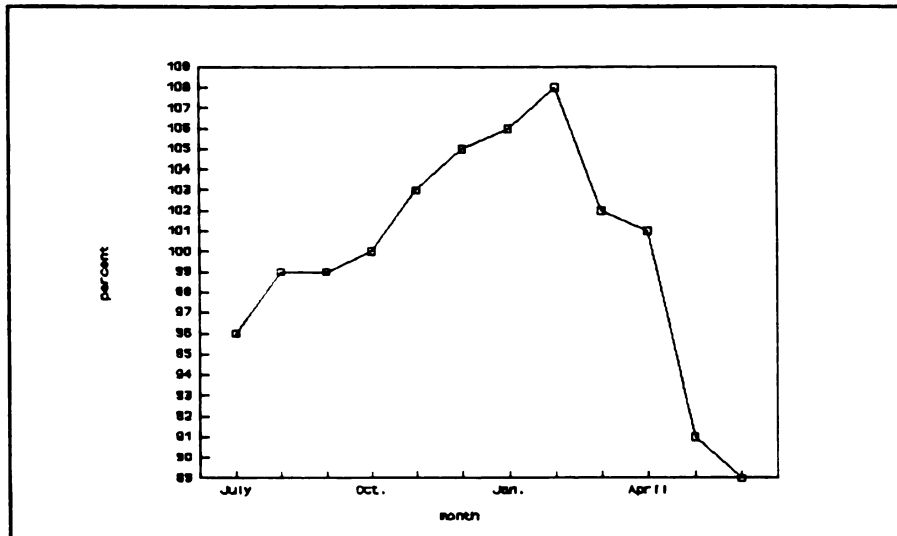
⁹ See Weber and Goetz for the discussion of this method.

correspond to the normal wheat production and harvest cycle. The seasonal low price occurs at the time when wheat is harvested. The seasonal high occurs in January and February when the market demand (possibly from those households with insufficient farm supply) is high.

The actual wheat sales pattern by the sample farmers during the 1987/88 wheat marketing year (Figure 5.5b) shows that the the percentage of wheat sold in January and February was the lowest, when the market price reaches its seasonal peak in these months. In contrast the wheat sales were relatively higher and wheat prices drop sharply beginning in March (and continued to drop until the next harvest in June).¹⁰

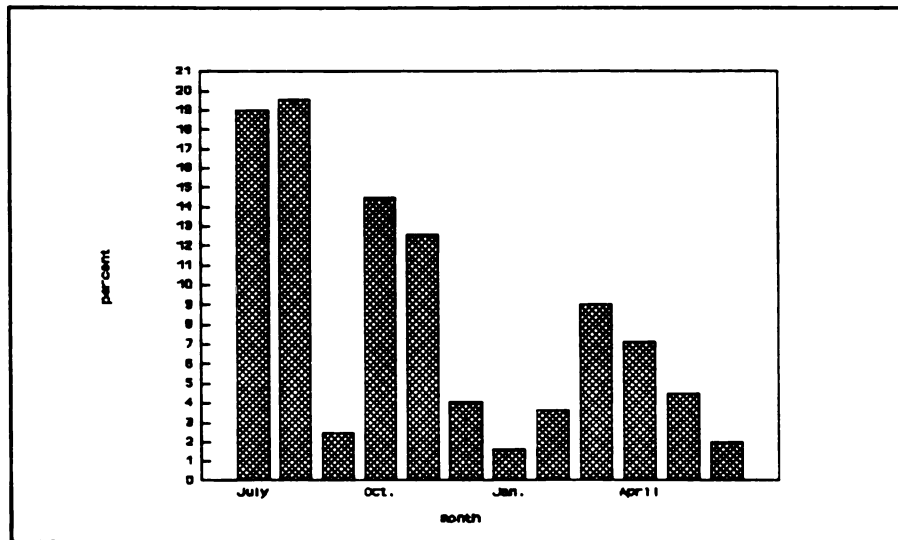
This pattern of wheat sales in light of the observed season price behavior indicates that farmers are most concerned with household food security. Although the market price is high in January and February, they do not want to sell their surplus wheat because, at this time they still are not sure about the size of the new crop. As the farmers have a clearer knowledge of the prospects for their forthcoming crop, they may be more likely to release old wheat and make storage room available for new wheat (in fact 1988 was a bumper wheat harvest in Xinxiang). By this time when farmers with surplus wheat release their stocks, the market prices would decline further. Furthermore, April and May begins the wet-moldy period, which can cause large storage losses for farm-held stocks.

¹⁰ It should be pointed out that the identification problem most likely exists because of the simultaneous determination of farmers' seasonal response of their marketed surplus to prices and the price seasonality. The data limitation prevents the researcher from exploring this problem. But the annual marketed surplus response to prices will be examined in Chapter Seven.



Source: Yuanyang County Market Administration Office, 1988

Figure 5.5a Wheat: Average Seasonal Price Index, Yuanyang Rural Markets, 1983 - 1988



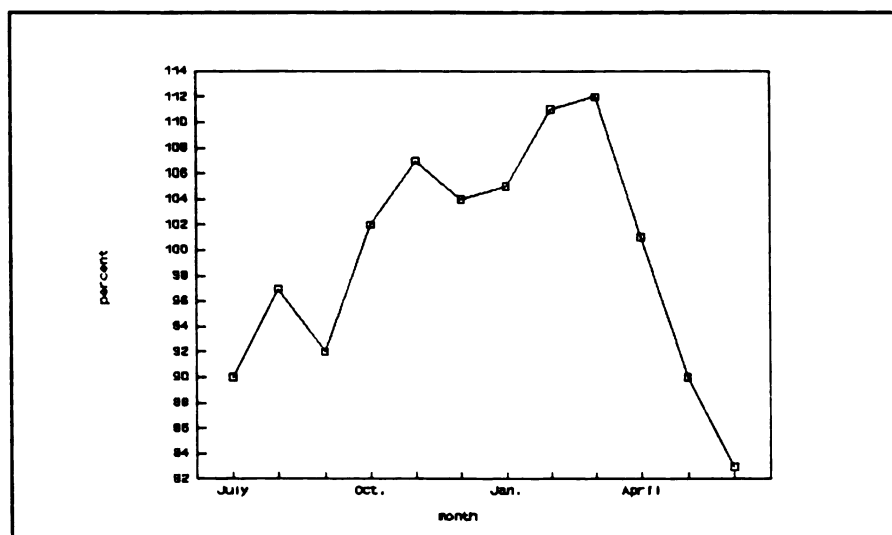
Source: Farm Survey, 1988

Figure 5.5b Wheat: Monthly Market Sales by Sample Farmers, 1988

Corn: The seasonal movement of corn prices exhibit somewhat larger fluctuations, ranging from a seasonal high of about 12 percent above the average in February and March down to a seasonal low of 18 percent below the average in June (Figure 5.6a). Most striking is that while corn usually is harvested in September, the lowest price is in June, three months earlier.¹¹ One possible explanation offered by the Rural Supply and Marketing Cooperative officials is that because the wet-moldy season occurs during these months, corn demand is very limited as potential buyers try to avoid storage losses.

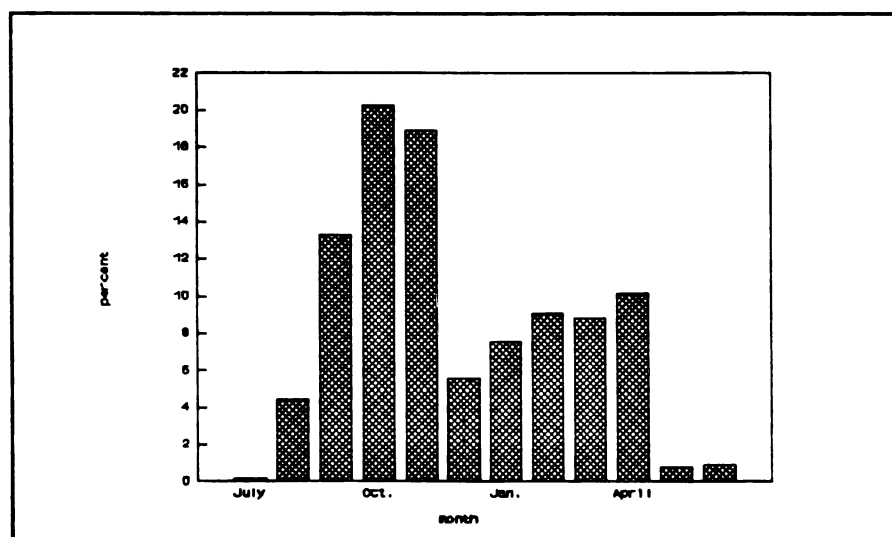
The 1987/88 data on corn sales by the sample farmers (Figure 5.6b) suggests that they responded well to the seasonal price movement. With the seasonally rising price after the harvest, farmers sold heavily during October and November. Another sales peak occurred during the first several months in next year. By May, the sample farmers had sold virtually all their surplus corn.

¹¹ Examining the yearly data shows that May and June are always the lowest price months.



Source: Yuanyang County Market Administration Office, 1988

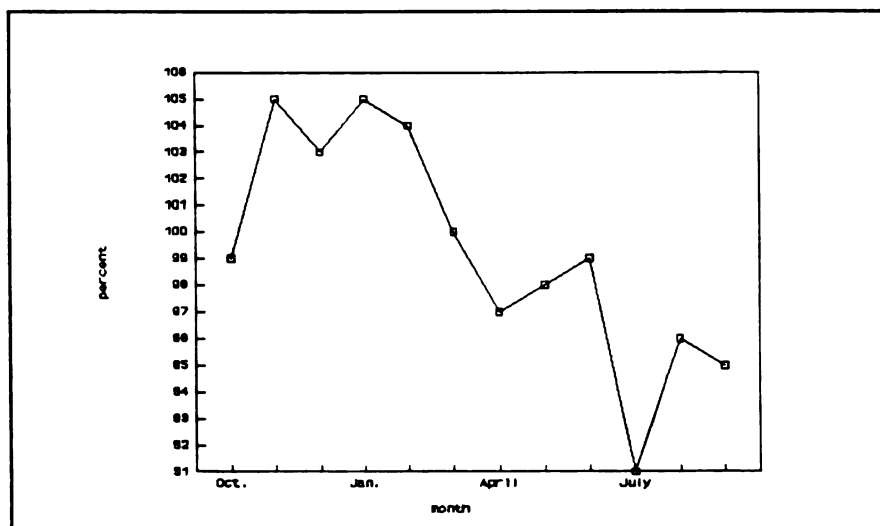
Figure 5.6a Corn: Average Seasonal Price Index, Yuanyang Rural Markets, 1983 - 1988



Source: Farm Survey, 1988

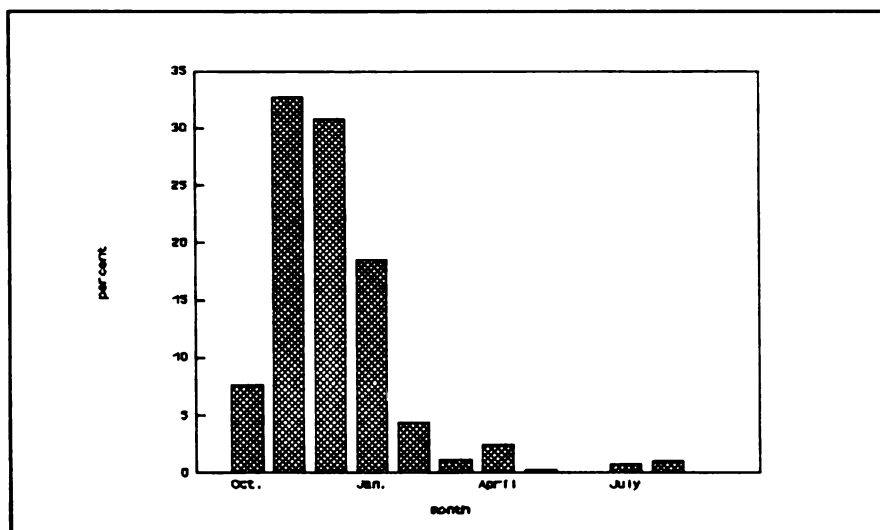
Figure 5.6b Corn: Monthly Market Sales by Sample Farmers, 1988

Rice: The seasonal price pattern reveals a somewhat puzzling picture. Although the seasonality of rice production is such that November and December is generally the marketing period, it is also the time when the price reaches its seasonal peak. The prices then begin to decrease and dive down to the lowest in July (Figure 5.7a). The intensified market demand by traders and distant buyers as discussed earlier in this chapter offers one explanation why the market prices are much higher during the immediate post harvest months. Most of these buyers are either private traders or the state negotiated buying and selling companies. The purchased rice can be shipped out and quickly sold to consumers. In this case, the consumers would have to bear the high seasonal prices. When the rice is stored, it is not clear who bears the cost of storage and how they finance the apparent loss of any long term storage. But, one thing is clear, most of the sample farmers were not incurring the income losses. As the 1987/88 rice sales data from the sample farmers (figure 5.7b) show, farmers generally sold most of their surplus rice during the seasonal high prices from November to January of the next year.



Source: Yuanyang County Market Administration Office, 1988

Figure 5.7a Rice: Average Seasonal Price Index, Yuanyang Rural Markets, 1983 - 1988



Source: Farm Survey, 1988

Figure 5.7b Rice: Monthly Market Sales by Sample Farmers, 1988

A Summary: In general, the price series for all three grains do not show large seasonal fluctuations. The seasonal wheat market prices behave as expected in that seasonal high and low prices correspond to the production cycles. For both corn and rice markets, the seasonal prices behave somewhat "abnormally" -- the seasonal highest prices occurred during the post harvest period. This observed anomaly of the seasonal price behavior is attributable to a set of factors. Perhaps the most important factor is that the seasonality of corn and rice production in this region may well be the opposite to that in other regions that are major rice and corn producers. If this is true to the extent that the interregional grain movements exist, the price seasonality observed in Xinxiang might in fact reflect the "normal" seasonal price patterns of other regions. In addition, the government marketing system's drive for the quick purchase might also have some significant impact. Clearly this type of "reversed order" between price and production seasonality in the study area does not provide an economic incentive for any long-term storage of either rice or corn. Certainly it is not in the interest of private traders to invest in grain storage.

B.2 Estimated Gross Returns to Grain Storage

Table 5.16 presents the estimated gross returns to grain storage in percentage terms. The estimates represented what farmers or traders would have gained if they had followed the specified storage strategy. The typical storage strategy is selected based on the farm survey and trader interviews. The cost of storage includes only some modest losses

to grain stored. Costs such as handling costs, physical facilities, opportunity costs of capital, and pertinent risks are not included in the analysis. Thus the net returns would be much smaller than the estimates presented in Table 5.16. Since the seasonal price analysis above suggests that any rice storage beyond December until the next harvest would be unprofitable, there is no sense to report the estimated gross returns to rice storage.

Table 5.16
Estimated Gross Returns to Grain Storage in Percentage
Averages and by Year, 1983 - 1988 *

	Wheat			Corn	
Harvest Month		June		Sept.	
Selling Month	Aug.	Oct.	April	Nov.	March
Average Returns	12.7	13.2	-5.5	17.5	-3.2

Gross Returns By Year					
83/84	18.3	15.5	-7.5	3.9	-28.3
84/85	15.6	12.5	-26.5	29.8	19.3
85/86	6.7	0.5	9.4	4.1	14.9
86/87	26.2	34.1	8.5	47.6	-0.6
87/88	6.7	11.5	-11.3	2.3	-21.2
88/89	2.8	5.0	na	na	na

* Gross returns in percentage are estimated by following formula:

$$RET(i) = (Ps(i) - Ph * (1 + SL * N)) / Ph * 100,$$

where Ps(i) = selling price in month i, adjusted to 1987 levels
 Ph = price at harvest time, adjusted to 1987 levels
 SL = physical loss to grain storage per month
 N = number of months that grain is in storage

Sources: Monthly price data are from Yuanyang County Market Administration Office. Monthly price index is derived from "Total Retail Market Price Index" in China Monthly Statistics Bulletin, various issues. Information on Physical loss to grain storage is from my Household Survey. The annual average losses are estimated at 6 percent for wheat, 8 for rice, 11 for corn.

For both wheat and corn, short-term storage within a two to four month period can be profitable. However, even in this case the estimated gross returns are very modest. The yearly results also show that returns are unstable and alternating between highs and lows. The reason for this is not clear. However this suggests that storage can be risky. One year's profitable storage strategy does not mean that the same plan would still be profitable the following year. Longer-term storage was not profitable and in this case the negative gross returns to storage tend to be very large.

To be sure, this analysis of storage returns focuses on the issue of profitability as a single objective, while ignoring other possible goals that farmers may have. For example, even though the ten month wheat storage plan from June to the next April is not profitable, the household food security concern as discussed earlier is likely to be ranked highly in households' management of wheat stocks.

C. Market Price Integration

The widespread prevalence of local assembly markets and dispersed village level marketing is one of the important findings of this study. One important issue in analyzing this type of marketing activity is whether these markets form an interrelated system. Do price signals in one assembly market reflect only the localized supply and demand condition, or do they reflect the aggregate supply and demand over a number of markets?

Field observations indicated that grain flows appear sensitive to price. Assemblers and traders can go to different villages to buy

grain. Farmers also choose different inter-village grain processors or shift from the village assemblers to periodic markets. Local assemblers in rural Huixian reported that they sometimes ship grain to the grain buyers in the county seat, and when prices are attractive, they also sell to buyers in Xinxiang or in distant areas. The County Negotiated Grain Buying and Selling Company in Yuanyang indicated that it has purchased grain outside of the county and suggested that this would increase as long as it proved to be profitable.

In order to understand the issue of how prices are related across different markets, market integration analysis at three levels is presented using the bi-variate correlation coefficient method. The three level analysis examines price movements: (1) among the fifteen surveyed villages; (2) across four rural periodic markets in Xinxiang; and (3) over even broader areas for seven markets in provinces surrounding Xinxiang, Henan Province.

C.1 Price Movement Among Village Assembly Outlets

Village leaders interviewed were asked about the average monthly prices for each of three grains for six months during the 1987/88 wheat season. Obviously, the price series are too short to provide a definitive examination of market integration. Nevertheless, a very preliminary exploration may still be helpful in terms of indicating the need for more systematic collection of market price information.

The bi-variate correlation coefficients of the monthly nominal average wheat price in fifteen village assembly outlets show that most of the coefficients are above 0.9 (Table 5.17). If the results tell us

Table 5.17
Bivariate Correlation Coefficients of Wheat Prices in 15 Village Assembly Outlets, 1987/88

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15
V1	1.00	0.95	0.97	0.98	0.98	0.95	0.89	0.98	0.99	0.97	0.81	0.94	0.99	0.24	0.95
V2		1.00	0.99	0.99	0.98	0.99	0.96	0.98	0.92	0.99	0.75	0.99	0.96	0.45	0.88
V3			1.00	0.99	0.99	0.99	0.96	0.97	0.95	0.99	0.73	0.98	0.96	0.44	0.88
V4				1.00	0.99	0.99	0.93	0.99	0.96	0.99	0.79	0.98	0.98	0.36	0.93
V5					1.00	0.98	0.92	0.98	0.97	0.98	0.79	0.96	0.98	0.39	0.94
V6						1.00	0.96	0.98	0.92	0.99	0.75	0.99	0.96	0.45	0.88
V7							1.00	0.90	0.85	0.94	0.54	0.96	0.86	0.53	0.73
V8								1.00	0.95	0.99	0.84	0.97	0.99	0.26	0.95
V9									1.00	0.94	0.80	0.89	0.97	0.25	0.95
V10										1.00	0.78	0.99	0.97	0.35	0.91
V11											1.00	0.72	0.87	0.05	0.95
V12												1.00	0.95	0.40	0.85
V13													1.00	0.21	0.97
V14														1.00	0.14
V15															1.00

Source: Farm Survey Data.

Table 5.18
Bivariate Correlation Coefficients of Corn Price in 15 Village Assembly Outlets, 1987-88

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15
V1	1.00	0.38	0.42	0.18	0.20	0.76	0.21	0.12	0.41	0.83	0.59	0.75	0.36	0.80	0.09
V2		1.00	0.89	0.96	0.96	0.01	0.72	0.82	0.60	0.27	0.43	0.49	0.27	0.36	0.91
V3			1.00	0.84	0.92	0.32	0.94	0.73	0.27	0.46	0.10	0.73	0.15	0.59	0.89
V4				1.00	0.93	0.16	0.69	0.82	0.61	0.19	0.34	0.42	0.36	0.30	0.90
V5					1.00	0.04	0.84	0.92	0.38	0.13	0.19	0.43	0.21	0.27	0.99
V6						1.00	0.32	0.33	0.21	0.83	0.05	0.81	0.88	0.84	0.11
V7							1.00	0.73	0.07	0.31	0.24	0.64	0.31	0.47	0.25
V8								1.00	0.21	0.25	0.03	0.08	0.38	0.10	0.96
V9									1.00	0.28	0.91	0.18	0.60	0.24	0.28
V10										1.00	0.29	0.93	0.59	0.98	0.02
V11											1.00	0.11	0.51	0.21	0.08
V12												1.00	0.61	0.98	0.34
V13													1.00	0.61	0.22
V14														1.00	0.17
V15															1.00

Source: Farm Survey Data.

anything, they suggest that the nominal monthly prices in different village assembly levels tend to move very closely together. One exception is Village #14, where the coefficients are generally less than 0.5. A closer look at the original price series indicates that in one month the reported price in that village is significantly different from those reported in other villages. This may be due to a price reporting error. Since there are only six observations in the price series, one observation with this kind of error would cause the results to collapse. Table 5.18 displays the correlation coefficients of monthly nominal corn prices in the same 15 village assembly markets for six observations in time. In general, the coefficients are very low, suggesting that the corn prices at the village assembly level are not moving closely together. Table 5.19 shows that rice prices at village assembly level for eight rice producing villages among the sample are moving together rather closely.

Table 5.19
Bivariate Correlation Coefficients of Milled Rice
Price in 8 Village Assembly Outlets, 1987 - 88.

	V1	V2	V3	V4	V5	V6	V7	V8
V1	1.00	0.99	0.98	0.99	0.99	0.92	0.95	0.99
V2		1.00	0.95	0.99	0.99	0.96	0.91	0.99
V3			1.00	0.93	0.97	0.84	0.99	0.96
V4				1.00	0.99	0.97	0.88	0.99
V5					1.00	0.94	0.94	0.99
V6						1.00	0.77	0.95
V7							1.00	0.93
V8								1.00

Source: Farm Survey Data.

C.2 Evidence from Different Periodic Markets in Xinxiang

The price data used here are from the Xinxiang City Office of Market Administration for the period of January to October, 1988. The price data were recorded at ten day intervals. The maximum number of observations is 30, although five to ten percent of the observations were missing. The calculation was only conducted for the pairs of markets with available data.

It can be observed in Table 5.20 that in general, wheat market prices seem to move more closely together among different markets than do the other crop prices. Since the characteristics of wheat production and consumption is similar within the region, higher coefficients for wheat prices may in effect contain certain common factors. Furthermore, wheat is subject to the quota procurement and the government is also involved in purchasing wheat at the negotiated prices, which tend to show smaller differences among the local markets.

Table 5.20
Bivariate Correlation Coefficients of Market Grain Prices
with-in Xinxiang Area, January to October, 1988

Market Pair	Direction/Distance	Wheat	Corn	Rice
Xinxiang				
to Yuanyang	E 35 km	n/a	0.79	0.75
to Huixian	W 32 km	n/a	0.65	0.83
to Zhengzhou	S 80 km	n/a	0.83	0.67
Yuanyang				
to Huixian	W 55 km	0.95	0.53	0.93
to Zhengzhou	S 70 km	0.93	0.91	0.67
Zhengzhou				
to Huixian	W 115 km	0.92	0.58	0.88

Source: Xinxiang City Office of Market Administration, 1988

C.3 Evidence from Several Broader Inter-regional Markets

The above discussion indicates that wheat markets within a radius of less than 100 kilometers tend to move closely together. This more localized market integration is quite likely also because within a region, restrictions to trade are not so strong as that across larger (especially provincial) administrative boundaries. We can investigate the extent of market integration, using the price data collected from broad regional markets in seven provinces. The markets selected are close to Henan Province and/or Xinxiang Municipality. The data come from two sources: the monthly price reports by Henan Province Grain Department for 1987 and the bimonthly price data released by the Ministry of Commerce for the 1988 and the first half of 1989. The maximum number of observations is 48. Missing data are still a problem but not very serious, as only two or three observations are missing from several series.

Examining the results in Table 5.21, we find that correlation coefficients are always higher among nominal prices than among nominal price changes. This result is expected. Nominal prices between even segmented markets in an inflationary economy will be correlated simply due to inflation. In fact, during the period under consideration, the country experienced an unprecedented rate of inflation (as discussed earlier in this chapter). Furthermore, nominal prices also include seasonal movements which increase the correlation coefficients without implying greater integration. This factor is also embedded in the above high correlation coefficients on nominal prices, as many of these regions are located in similar production zone (i.e. central China).

Calculating price changes removes most of the correlation related to this seasonality. The results show that the price movements are weakly linked over more distant markets, even though for regions that are more contiguous, such as Henan with Anhui and Shangdong, correlation coefficients are higher as compared to the cases of Henan with Tianjin and Shaanxi.

Table 5.21
Correlation Coefficients of Monthly (and Bimonthly) Wheat Prices
and the Price Changes in Seven Regional Markets.*
January 1987 to May 1989

	1	2	3	4	5	6	7
1. Henan		0.97	0.98	0.96	0.89	0.96	0.96
2. Shangdong	0.47		0.97	0.95	0.95	0.91	0.98
3. Anhui	0.74	0.61		0.94	0.88	0.91	0.96
4. Jiangxi	0.53	0.42	0.28		0.86	0.92	0.97
5. Tianjin	0.15	0.65	0.14	0.21		0.85	0.91
6. Hubei	0.38	0.13	-0.07	0.46	-0.04		0.92
7. Shaanxi	0.24	0.58	0.26	0.48	0.53	0.30	

* Upper Diagonal is the bi-variate correlation coefficients of nominal monthly wheat prices. Lower Diagonal is the bi-variate correlation coefficients of the nominal monthly price changes.

Source: Henan Grain Department, and China's Ministry of Commerce.

Possible explanations for this include the following. First, the transportation bottleneck may have constrained the free flow of grain inter-regionally (Lardy, 1989). The transportation system, especially rail transport, is still centrally controlled. Private grain movement

by rail is subject to the lengthy process of planned cargo allocation. Second, as explained below, there is frequently a conflict between administrative and economic boundaries. Local governments in the surplus region often prohibit grain outflow, simply because they are afraid that would drive up the local market prices, which would create even greater difficulty in enforcing the fulfillment of quota grain procurement. Furthermore, they would like to see the surplus grain utilized by local food manufacturers, whose tax payments on profits form an important part of local budget revenues.

The above preliminary analysis and observations on price-induced market flows suggest that prices on free grain markets are influenced by the forces of supply and demand. However, the results are not definitive in establishing whether markets are well integrated and/or efficiently competitive. First, the quota grain procurement still accounts for a significant share of total marketed surplus and its price level is centrally fixed and pan-territorial. The influence of quota price and quantity on market price behavior needs to be taken in consideration if any sensible analysis of market integration is to be conducted.¹² Second, there is still ample evidence of administrative and natural barriers to the inter-regional trade (see the discussion

¹² Sicular (1988) has proposed such an approach specifying a generalized disequilibrium spatial price formation model to incorporate the impact of quota price and quantity. Two regimes of market price behavior are hypothesized in the model, one is when market price is less than or equal to quota price and the other is when market price is higher than quota price. In the first case, quota price dominates spatial price formation and since the quota price is basically pan-territorial considerable correlation is expected of prices in different markets. When market price is higher than quota price, typically as the quota is binding, then the influence of quota price is less important.

below, and also Lardy, 1989). In fact the spatial price differences among markets in an even more limited radial circle appear to be in excess of the average costs of transport and vary greatly during a year (Table 5.22).

Table 5.22
Apparent Spatial Price Differences between Markets in
Xinxiang, Huixian and Yuanyang, 1988, yuan/kg ^a

	Huixian to Xinxiang 32 kms		Yuanyang to Xinxiang 35 kms	
	Milled Rice	Corn	Milled Rice	Corn
Jan 1	0.05	0.02	0.06	0.05
11	0.04	0.02	0.04	0.04
21	0.03	0.00	0.05	0.04
March 1	0.06	na	0.23	na
11	0.10	0.06	0.27	0.10
21	0.10	0.03	0.20	0.03
May 1	0.04	0.00	0.00	0.04
11	0.02	- 0.01	0.00	0.04
21	0.00	- 0.01	- 0.04	0.04
Aug 1	0.04	0.03	0.10	0.03
11	0.04	0.04	0.12	0.04
21	0.10	0.07	0.18	0.05
Oct 1	0.10	0.18	0.10	0.18
11	0.03	0.12	0.02	0.08
Average Cost of transport	0.02	0.015	0.03	0.02

^a Wheat prices were not available for Xinxiang Free Markets.

Source: Xinxiang Office of Market Administration

Third, current collection of price data is only simple monthly average prices. The field observations suggest that the market prices change frequently. Prices in one particular market can be different day by day. The monthly average prices are likely misleading about both short-run and long run transmission of prices among different markets.

Given the above identified issues, in-depth research would be needed to determine more accurately the extent of market integration in the local and regional markets and investigate especially the sources of market segmentation or fragmentation, such as the effects of regional trade restriction and quota procurement program as well as natural barriers like the cost of transport. The theoretical foundation and empirical methodology for analysis of market segmentation and integration based on market price data already exist.¹³ Future research can apply this method to available price data. This again calls for the improvement of market information system (such as better quality price information) to accurately monitor the market behavior.

5.5 Government Regulations in Grain Markets

Two issues stand out in terms of the government regulation in grain markets, namely: (1) what are the needed supportive government regulations, based upon the available information about the existence and functioning of grain markets? and (2) what have the governments actually done? Such a distinction is important; obviously reforms of the magnitude that aim at fundamentally transforming the previously

¹³ For example, Ravallion (1985), Timmer (1987) and Sicular (1988).

controlled and monopolized arrangement to a liberalized and market-oriented system would require the design and implementation of a new set of government institutions that are conducive to the development of a competitive marketing system and improvement of market functioning. On the other hand, one has to realize that the inertia and persistence of the existing institutions result in government actions that frequently counteract the objective of market liberalization.

This section examines the second issue while the first issue will be relegated to Chapter Eight where the discussion focuses on the policy implications for the supportive government regulations toward an effective grain marketing system.

There is much evidence indicating the governments have exercised measures that act against the process of market liberalization. For example, there have been significant policy inconsistencies regarding the entry of private traders into grain marketing activities and their involvement in inter-regional grain trade. As early as 1982 the central government policy on commodity marketing systems maintained that farmers could sell their surplus farm products above the quota delivery targets in the rural periodic markets. The commodity end-users, facing a shortage from the rationed distribution, could then directly purchase in the periodic markets but they should not act as the middlemen in buying and selling (China Agricultural Yearbook Regulation Section, 1981). Later the central government (China Agricultural Yearbook Regulation Section, 1983) modified the policy so that farmers and other non-official traders could participate in grain trade across regions on the assumption that grain quota targets had been fulfilled. Furthermore, the

private grain trade across different regions required no written permission from various levels of government.

In 1988 there were drastic modifications to the above policy decrees. In early 1988, the State Council's order to provincial governments stated (Henan Grain Situation Newsletter, January 10, 1988) that the multiple-channeled grain marketing system was to be maintained. When the grain quota targets were fulfilled, the surplus grain could be freely moved across counties and provinces. Private grain traders with proof of adequate working capital should register and be licensed at their respective Market Administration offices and then allowed to operate. Different institutional buyers could still freely purchase the amount of grain for their own use but could not participate in trading as middlemen. Distant buyers could negotiate directly with sellers or traders in surplus regions, but they were required to report their purchases to the Market Administration Office in that region.

However, by August of 1988 the State Council reversed their policy, stating that no private grain trade was allowed across provinces (Henan Grain Situation Newsletter, September 1, 1988). The inter-regional market grain trade had to be closely controlled by the Ministry of Commerce and the respective provincial governments. Distant buyers were ordered to stop directly purchasing grain in surplus regions. Transportation departments and the Market Administration office should cooperate in enforcing this decree. Road blocks and check points were to be restored. If no such check points existed previously, new temporary check points should be established.

In responding to the new decree, the Henan Provincial government

along with several provincial departments (Grain, Market Administration, Public Security, and Price Bureau) issued a set of more detailed regulations, including the provisions that market grain transactions would only be allowed within the provincial territory until such time as the intra-provincial grain balancing was completed, then the outside-buyers would be allowed to purchase grain for shipment outside of the provinces. Even then the certificate of transport had to be issued by the provincial Grain Department for any amount of market grain flowing outside Henan province. Without the certificate, the check points are entitled to confiscate such illegal grain outflow or to purchase it at the lowest quota price.

Such abrupt changes in government policy have created problems for private traders and the proper functioning of grain markets in general. For example, many purchase agreements that were negotiated before the new decree could not be honored. Although the decree was specific only in terms of rice marketing, local governments applied the restrictions uniformly to other grains such as corn. In November of 1988 the Huixian corn markets were officially closed. Unfortunately two major rural fairs were to be held during this month where farmers had traditionally sold their surplus grain for cash in order to buy other goods. Many farmers complained that the market closure prevented them from selling surplus corn to gain needed cash income.

During my final field visits in October and November 1988, several licensed private traders reported that their licenses had been suspended or not reissued because of the new policy drive. However it was also observed that several private traders were still secretly purchasing

corn and paddy rice and trying to "smuggle" it to other regions. Such observations raise doubts about the degree of effectiveness of the restrictive government policies. Furthermore, the costs of "illegal" private transactions would certainly increase in order for private traders to compensate for their risk.

The pre-emptive intra-provincial grain trade was being organized by provincial grain departments. In the late October 1988, the Henan Grain Department convened its subsidiary county grain bureau leaders to internally solve the "province's grain dislocation". During this three-day meeting, about eight million tons of grain were agreed to be traded within the province, of which 50 percent was milled rice, less than 10 percent was wheat, and about 20 percent was corn.¹⁴

This type of wholesale grain "trade" by grain departments clearly helped in smoothing within-region grain dislocation. Nevertheless, problems still existed concerning cost-effectiveness of such trade within an administrative boundary. For example, Huixian county borders on the northwest with Shanxi, a major grain deficit province. Grain flow from Huixian to Shanxi would most likely help increase the grain supply in Shanxi with low costs of transport. However, such direct trade between Huixian and Shanxi was forsaken in favor of the official claimed priority of the intra-provincial grain trade. Huixian wheat and corn had to be moved to the southern Henan in accord with the provincial grain department's decree. But the transportation distance between the latter is much longer than between the former.

¹⁴ The data is from the Henan Province Grain Department Interview notes, November 8, 1988 in Zhenzhou.

It is important to understand some underlying factors and motives that have prompted the governments at different levels to frequently act against proper functioning of open market trade. The unreformed aspects of the system are certainly the most important factor. This issue can be looked at in the following ways. First, the quota grain procurement remains and local officials are often judged by how quickly and how completely the quota targets are fulfilled. The 1988 open market policy turn-around was basically driven by this factor. In that year, national grain production fell short of what was expected. In order to ensure the fulfillment of quota targets, the central government outlawed private grain trade to avoid probable price increases in some producing regions where the quota targets may not have been fulfilled. Since the quota price is generally lower than the market prices, any further rise in the market prices as a result of open grain trading would create more difficulty for these regions to fulfill their quota targets.

Second, and especially in surplus grain producing regions, even though the quota targets had been fulfilled, to outlaw the private traders would reduce competitive pressure for the state grain departments. Increased volume of grain buying and selling by the official grain traders would raise their gross revenue, which is an important source of partially financing the government budget losses in the rationed grain distribution. As we have seen, the mechanism used to secure this part of revenue is through the required profit submission by local grain enterprises.

Finally, although the overall grain procurement quota was reduced in recent years, a corresponding reduction in rationed grain

distribution has been slow in coming about. Consequently the governments had to rely on market level purchases to make up the difference. It was estimated that between 1986 and 1988 at the national level an average of more than 10 percent of total grain purchase by state grain departments was bought in that manner. Increased competition from private traders was held responsible for rising market prices, aggravating the total cost of grain price subsidies in those years.

Another factor prompting the government to restrict open market grain trade is inflation control. In fear of run-away inflation, the national government determined an overall target level of price increase each year. This overall level was then allocated to each province, city and down to county level. For example, by late 1988 the Henan government reported that it had received an order from the State Council that the 1989 general price increase in Henan should not exceed 10 percent over the previous year. According to this order, Henan government ordered that each city and county within the province be cooperative in this regard to avoid excessive price increases. As a result, the control of grain market prices would certainly help reduce the possibility of general price increase exceeding the set limit.

Other considerations behind market controls included arguments by different government officials that grain markets were underdeveloped and that private traders often exhibit opportunistic behavior, exacerbating market instability. Hence, they argued that rather than continuing with the underdeveloped markets in the short run it is necessary for the state grain marketing arrangements to take the responsibility for entire grain procurement and distribution. Although

there is merit in such an argument, the policy suggestion does not seem to be constructive. While private traders may behave in an opportunistic way, the fundamental reason for such behavior may be the lack of institutional support and stable expectations about government policies toward open market trade. In addition, the very reason for private sector involvement is to further restructure the monopolized official grain marketing and to increase the competition among traders, thus improving the efficiency of market operations. In order to achieve the restructuring goal the government should provide a market environment that will support the development of efficient private sector participation rather than to suppress it.

5.6 Chapter Summary and Implications

This chapter described the policy evolution in the grain marketing system in Xinxiang. Several aspects of the existence and functioning of local assembly markets were examined in detail. How and why the government grain procurement agencies have acted against the functioning of open and competitive grain markets was examined.

The government concern for budgetary pressures was the immediate motivation for the post 1985 policy adjustments in the quota grain procurement system. All grain crops except wheat have been excluded from the quota procurement program in Xinxiang. Overall, the grain quota target was reduced significantly. These adjustments triggered the need for a careful examination of alternative marketing channels which would partially replace the state monopolized procurement system.

Local assembly markets emerged with the participation of private traders and their role expanded from the balancing of localized grain supply and demand to greater involvement in inter-regional trade. Distant buyers have come directly to the area or some types of informal contracts or agreements have been developed to coordinate the grain supply and demand at a broader market level. Opening up these alternative marketing channels most likely benefits the rural grain sellers since now they have different marketing options to choose from and this increases their bargaining position. As a result, farmers would be immediate defenders for the new marketing arrangements. On the other hand, the existing state grain marketing enterprises faced the increased competition from private traders. Because of their organizational and institutional inflexibility, the market share of the state grain marketing agencies at the local assembly level has clearly decreased. And the vertical hierarchy within the public grain system has been breaking down. Competition is seen not only between the state grain marketing system and private traders, but also among the different state grain enterprises as they engaged in operations outside of the prescribed administrative hierarchy. The dispersed nature of local assembly markets, specifically the predominant practice of village level assembly has shortened the marketing chain, but it also has created some difficulties for market regulating agencies.

Although local assembly markets are functioning, the effectiveness of their operations is subject to further investigation. A difficult problem identified is the poor performance of temporal and spatial price coordination in the grain markets. The seasonal price movements for

both corn and rice seem inconsistent with the general production and harvest cycles. The data limitation prevents the current study from further explaining definitively why the prices for these crops were behaving "abnormally", though several hypotheses were offered. Further study is needed to examine more fully the impacts on temporal and spatial market integration of the procurement practice by the government marketing agencies, the interregional factors of grain supply and demand, and the financing of the grain storage.

The study found that there is a need for immediate government supportive actions in the areas of increased dissemination of spatial and temporal price information, provision of commercial credit to private traders, and a clearer specification and implementation of standard measures and grades in grain markets. The study also indicates that there unfortunately has been an overriding tendency for the government agencies to resist or reject the open grain market trade. Factors contributing to this tendency include the unreformed aspects of the system, the overall price control motivations, and the government's ill-conceived perceptions about the development of a competitive grain marketing system. Further reform lies in the transformation of the existing institutions into new forms that can support the development of a truly market-oriented grain marketing system. Such an institutional transformation could be very difficult because of the inertia and vested interests of the existing government agencies. All this would imply that the overall ideology about the emergence of open markets and the proper delineation of roles of public versus private sectors has to be re-oriented. The final chapter discusses this in more detail.

CHAPTER VI

FARM HOUSEHOLD WHEAT PRODUCTION AND MARKETING ACTIVITIES

Chapters Six and Seven examine farm household wheat production and marketing behavior using the survey data collected from a sample of 150 households in Xinxiang in the summer of 1988. The focus solely on wheat is undertaken for the following reasons: (1) Wheat is one of the few crops grown during the winter and spring season and is the households' preferred food staple in the region, and (2) at present wheat is the only crop that is subject to state quota delivery. These unique characteristics allow us to analyze determinants of the wheat production, consumption and marketing behavior and the impacts of quota delivery and other policies on wheat production and marketing behavior.

This chapter addresses two questions: (1) Given the existence and operations of local grain markets examined in Chapter Five, how have farmers gained access to and utilized the marketing services? (2) What are household-specific and other institutional factors determining wheat production and marketing patterns? Using cross-tabulations and frequency tables, a descriptive analysis explores opportunities and/or constraints that are likely to influence household responses. This descriptive information will be used in Chapter Seven to develop a formal model to examine the household wheat activities, and to estimate the impacts of quota procurement and other policy measures.

6.1 Household Wheat Sales Behavior

This section first provides an overview of average grain production and marketings of the sample households. Household wheat quota deliveries and open market sales are then described in detail. This description aids in examining possible impacts of wheat quota obligations and market access factors on household wheat sales.

A. Overview of Farmers' Grain Production and Marketing

Farm households in the sample were engaged in the production of three major grain crops (wheat, corn and rice) in addition to other minor grains and cash crops. All households in the sample produced wheat during the winter and spring season. A fairly large portion of the households also grew corn and/or rice in the summer and fall season (Table 6.1). The average grain production per capita of the sample households was 892 kilograms, which is about 66 percent and 74 percent higher than the national and the Henan provincial averages in 1987, respectively. This relatively high level of grain production likely results in a substantial amount of the marketed surplus. Indeed the average grain sales in the sample accounted for 55 percent of the production, which is about twice the national and the provincial average.¹ The high grain marketing rate holds for all groups stratified by farm size and by county. This observation reflects that on the average, the sample farmers are quite

¹ The national and Henan provincial average grain production per capita of rural households is from China Statistics Bureau Farm Survey Report (1987), p. 111. Note the grain production figures in that Report also include other minor grains like sorghum and millet as well as soybeans in accord with the Chinese statistical definition of grain.

commercialized. Nevertheless, the results also show that the production and marketings of individual crops differ sharply by farm group and county. In addition, it is interesting to note that the average wheat marketing rate appears inversely related to the farm size. This pattern of wheat sales is counteracted by rice and corn sales in the opposite direction so that the overall marketing rate tends to be fairly stable and increases as the farm size increases.

Table 6.1
Survey Statistics on Households' Major Grain Production and Sales
by Farm Size and County, in 1987/88 crop year

	All	Farm Size, mus					Huixian	Yuan- yang
# of Farms	150	< 5	5 -10	10-15	15-20	>=20		
		16	65	49	15	5	70	80
Percent of Farms Producing								
Wheat	100	100	100	100	100	100	100	100
Rice	53	44	46	57	67	100	0	100
Corn	75	94	89	67	40	0	100	53
Per capita grain production in kilograms ^a								
All/Average	892	512	797	1048	993	1496	985	810
Wheat	428	262	416	504	393	479	507	358
Milled Rice ^b	401	288	206	441	649	1017	0	401
Corn	334	132	321	435	418	0	478	96
Marketing rate in percentage ^a								
All/Average	55	51	48	58	69	59	56	54
Wheat	46	59	45	49	45	29	57	34
Milled Rice ^b	78	60	72	76	94	73	0	78
Corn	50	20	45	58	60	0	54	15

^a For wheat, the marketings including the quota delivery and open market sales. For rice and corn, production and marketing rate figures refer to group averages of those farms that reported producing the two crops.

^b A milling rate of 70 percent is assumed to convert paddy into milled rice.

Source: Farm Survey.

While the results indicate that group differences in household farm size, grain production mix, and geographical location are likely to have impacts on the average wheat marketing rate, they are also incomplete. The conceptual framework in Chapter Three hypothesizes additional factors that influence wheat production and consumption and have potential effects on wheat marketed surplus. A further examination of the farm survey data is necessary to identify the relative importance of the different factors on wheat marketings.

B. Wheat Quota Obligations

The first factor examined is the wheat quota obligations. Farm households in the study area are required to deliver an assigned amount of their wheat production to the state at quota prices that generally are lower than market prices. While the Xinxiang government in early 1988 announced that the state grain quotas would only contain wheat, this single quota delivery program had been implemented in the two counties since 1986/87. For the sample households the average share of wheat in total grain quotas was 70 percent in 1984/85. Since then the share of wheat quotas increased and after 1986/87 practically all the quota delivery was in wheat (Table 6.2). The results also show that while the average total grain quotas were reduced by about 54 kilograms during the past five years, the wheat quotas were increased by about 100 kilograms.

Table 6.2
Average Share of Wheat Quota Delivery in Total Grain
Procurement for the Sample Households, kg

Year	Total Grain	of which: Wheat	Percent Share
1984/85	517	361	70
1985/86	499	400	80
1986/87	477	468	98
1987/88	463	463	100

Source: Farm Survey.

B.1 Allocation of Wheat Quota Targets

Quota allocations usually involve a prolonged bargaining-negotiation process at administrative offices at different levels. The county grain department receives the county-level procurement targets from higher levels, which it divides among its component townships. Townships divide their targets among their component villages, and the villages then divide them among households. The setting of targets is not an entirely top-down process. Meetings are held at each level where allocations are discussed, and the lower levels will bargain for more favorable target assignments. As a result of this time-consuming process, farmers often do not know what their quotas are until well after the planting season. For example, six out of the fifteen villages reportedly received their final targets after the spring festival time in February, and another nine villages received the targets just before the wheat harvesting time in May or June.

Village-level quota targets are reportedly set in line with the production possibilities of each village reflected by the quantity and quality of the cultivated land. Other factors include crop composition

and the consumption demand for wheat by village farmers. Within each village, the quotas are tied to the amount and types of land cultivated by households and/or family size. For example, local leaders in twelve villages indicated that the targets were assigned to households mainly in accord with the farm size, while the other three villages reportedly assigned the targets on the basis of family size.

Large variation of wheat quota targets is observed among the sample households. In the 1987/88 crop year the average wheat quota was about 24 percent of household production, although the proportion per household varied from 6 percent to 65 percent. Table 6.3 indicates that while average quantity of quota targets rises as farm size increases, some other factors also cause the larger farm groups to have a greater variation of the quota targets. In addition, there is a significant difference of quota targets across two counties. On the average, Huixian farmers had to deliver more wheat to the state than did Yuanyang farmers.

Table 6.3
Average Wheat Quota Targets by Farm Size and County
during 1987/88 crop year, kg per farm

	Average	Farm Size, mus				
		< 5	5 -10	10-15	15-20	>=20
HuiXian	512 (319)*	186 (86)	405 (190)	700 (321)	1048 (239)	-
Yuanyang	421 (232)	186 (27)	284 (105)	473 (127)	602 (134)	922 (426)
All Sample	463 (278)	186 (66)	349 (161)	570 (255)	751 (274)	922 (426)

* Figures in parenthesis are group standard deviations.

Source: Farm Survey Data.

Taking the aforementioned factors into account, one would expect that the level of wheat quota would depend on factors such as family size, land size and village affiliation. The results of a linear regression of the allocated quota targets among households in the 1987/88 are consistent with these expectations (Table 6.4). The wheat quota is positively related to farm size and family size, but negatively related to household labor dependency ratio mainly because of the consideration of household wheat consumption demand. Village affiliation is a very significant explanatory variable. Five village dummy variables are significant and positive, and another five village dummy variables are significant and negative. This suggests that adjusted for population, land and household dependency ratio, allocation of delivery quota is unequal among villages.

Table 6.4
Determinants of Household Wheat Quota Targets, 1987/88

Variables	Coefficients	T-Statistics
Family Size	19.01	3.40
Farm Size	35.81	12.80
Dependency Ratio	-23.42	-2.07
D2	-77.98	-2.31
D3	205.82	5.72
D4	571.73	15.66
D5	132.72	3.54
D6	-141.99	-3.95
D7	101.18	2.81
D8	-19.16	-0.57
D9	-111.34	-2.92
D10	27.00	0.79
D11	-147.04	-4.22
D12	19.71	0.55
D13	-6.65	-0.19
D14	-165.43	-3.54
D15	191.20	4.48
Intercept	4.02	0.11
Adjusted R ² = 0.94		F(17, 132) = 117.71

Source: Estimated from Farm Survey Data.

B.2 Incentive and Disincentive for Quota Delivery

Farmers' Compliance of Quota Obligations One finding from the farm survey was the significantly high fulfillment rate of wheat quota targets in the 1987/88 season. Of 150 households, 118 completed their quotas. Twenty four households actually delivered to the state 5 percent more than the quota targets required. Only eight households delivered less than 95 percent of the targets (two of the eight failed to complete the targets by more than 30 percent).

The field research reveals that the high rate of quota compliance was due to the following factors. First, in a number of villages the administration of farm land allocation (or land use rights) was set such that the wheat quota targets were tied to household land use rights. Persistent underfulfillment could endanger household's right to the land. Such a penalty seems to be an effective incentive for the sample households to reach for a high rate of quota fulfillment. As all farmers in the sample are grain producers, their economic reliance upon farm land leads them to abide by the quota requirement. One of the original hypotheses of this study was that if one farmer saw others in same village had failed to fulfill their quota, this type of peer group effect might lead to that the farmer would also do the same. The survey results suggest that such peer group effect is limited, at least among the sample households. A half of the sample farmers reported that during the 1987/88 season they did observe some farmers in village who failed to deliver their quotas, yet they themselves still complied with the requirement.

Second, in other locations local leaders go to farmers' homes one by one persuading farmers to fulfill the quota and in some cases forcing them

to do so. Farmers in four villages reported that local leaders previously had employed such methods as a threat of removing household furniture (or other belongings) and suspension of households' family planning permits to ensure the quota delivery. Nevertheless, the incentives for a local leader to forcefully monitor farmers' quota fulfillments were mixed. On one hand, with a high fulfillment rate at the village level, he would be honored by higher level governments which provides a positive incentive. On the other hand, he would not want to have a bad relationship with his fellow villagers. Interactions of the positive and negative incentives would require the leader to keep a very delicate balance when choosing among alternative enforcement methods. Some modest means for enforcing quotas reportedly included for farmers either to complete their quotas by supplementing with corn and rice or to pay in cash the difference between the quota and market prices plus an amount of monetary penalty.

In addition to the above "village-level" means of ensurance, an external factor of reducing the incidence of quota evasion is the foreclosure of open market trade during the quota delivery periods. As discussed in Chapter Five, the municipality government issues the order during the period to prohibit private traders and the state buying stations from purchasing wheat in markets. On the other hand, farmers were required to pay for at least 50 percent of the land taxes and other local levies during the wheat harvest season. These two factors combined might also result in that farmers have only one channel to sell their surplus wheat and use the sales revenue to pay the taxes.

Input Subsidy Programs Positive incentives with the quota delivery include several proclaimed input subsidy programs. According to the

Xinxiang government, farmers delivering wheat quotas were to be provided with (1) credit advances ranging from 20 percent to 50 percent of the quota sales and (2) the right to subsidized chemical fertilizers based on the formula that a 100 kilogram wheat quota delivery entitles the farmers to 10 kilograms of fertilizer. However, the farm survey revealed that for the sample households in the two counties, no credit advance programs were available. The administrative cost of allocating credit advances could be prohibitive since the government has to determine for each household the amount of credit advances. Furthermore, grain buying stations have little incentive to acquire the credit advances and allocate it among farmers, because they have to bear the interest charges on loans providing the funds for credit advances.

Urea is the main subsidized fertilizer linked to quota delivery. When farmers delivered their quotas, they received a written certificate indicating the amount of urea fertilizer they were entitled to purchase at subsidized prices. The official data provided by Xinxiang government shows that the total subsidized urea distribution increased by 44 percent from 18,000 tons in 1985 to 26,000 tons in 1987.² But, the farm survey revealed that more than half of the sample households in 1987 did not purchase the subsidized urea in 1987. In addition, about 60 percent of those who purchased paid an average 950 yuan per ton for urea, a price that was about twice the subsidized price in 1987.³

² The figures were from the Xinxiang Fertilizer Distribution Company, 1988

³ This finding concurred with the results of a separate study of the Xinxiang City Government which was conducted for a sample of 700 households in all eight counties in late 1987 (see Xinxiang City Government, 1988).

This contradiction from two data sources can be explained in several ways. First, the quantity of subsidized fertilizer distribution at the municipality level might not have been translated accordingly down to local levels because of regional differences in the fertilizer allocation rules. Second, even though the city distributed a certain amount of subsidized fertilizer to local distributors (state run agents or cooperatives), the distributors may have sold it to farmers at market prices. The fertilizer shortage has driven the market prices about two times higher than before. For example, the average market price of urea was 545 yuan per ton in 1985 and 985 yuan in 1986. By the early 1988, the market price had risen to 1300 yuan per ton. As a result there has been increased evidence that the local fertilizer distributors sold the subsidized fertilizer at market prices.

An issue still remains. Even if farmers could get access to the advance credits and subsidized fertilizer, would the credit help farmers purchase the modern inputs for the crops on which they would like to apply them? The farm level quota allocation, as pointed out earlier, was often finalized after the planting season. Any credit advances based on the farm quota targets would be ineffective in helping farmers purchase modern inputs for new crop production. Moreover, while the input subsidy program was supposed to provide a price incentive for farmers to grow wheat, they may likely apply the fertilizer on more profitable crops. Thus, the input subsidy program serves only as supplementary income from the farmers' perspective, albeit an insignificant program since the subsidized quantity is very small and many farmers still could not get that.

Income Loss from Quota Sales and Implicit Taxation Since the quota prices are usually lower than the market prices, quota delivery can be viewed as an income loss from the farmers' perspective. Table 6.5 provides the estimated average income losses from quota sales by farm size. The wheat quota price is from the county grain bureaus. The market price is the village weighed average selling prices in free markets. The estimated income losses are obtained by multiplying quota quantity by the price difference, assuming that market prices would have been the same in the absence of quotas.⁴ The results indicate that the income losses at farm level increases as the farm size increases. This is mainly because the large farms have significantly higher quotas.

Two additional results are also provided in measuring the relative magnitude of the income losses. One measure is the income loss as a percentage of cash income from total wheat sales. The cash income from total wheat sales is derived as sum of the household reported wheat sales plus the income losses that would have been gained should there have been no quota delivery. It shows that the income losses in general amount to about 9 percent of the cash income from wheat sales, except for the largest farms in which the income loss was close to 20 percent. In other words, farm income would increase by 9 to 20 percent if the quotas were removed.

⁴ This assumption about market prices is only a first approximation.

Table 6.5
Estimated Average Income Loss from Quota Sales by Farm Size
During 1987/88 Wheat Season

Items	Average	Farm Size, mus				
		< 5	5 -10	10-15	15-20	>= 20
Farm size, mu	10	4.1	7.5	11.9	16.9	22.6
Wheat quota/farm, kg	463	186	349	571	751	922
Market Price, yuan/kg	0.57	0.58	0.57	0.56	0.56	0.57
Quota Price, yuan/kg	0.46	0.46	0.46	0.46	0.46	0.46
Price Difference, yuan/kg	0.11	0.12	0.11	0.10	0.10	0.11
Income Loss/farm, yuan	50.93	20.46	41.88	62.81	75.10	92.20
Loss as % of cash income ^a from total wheat sales	9.06	8.36	9.21	8.33	9.90	18.66
Income Loss/mu, yuan	5.09	4.99	5.58	5.23	4.44	4.08

^a Cash income from wheat sales is from Table 6.13 below.

Source: Farm Survey, 1988

The second measure is the income losses per mu of farm land. It is used to evaluate the extent of implicit land tax due to quota delivery. The average direct land tax in Xinxiang in 1987 was about 6 kilograms of wheat equivalent or 2.76 yuan per mu at 1987 quota prices. For the sample households the average income loss due to quota delivery was 5.09 yuan per mu, the amount being 85 percent higher than the direct land tax. Thus the imputed total land tax was about 7.85 yuan per mu. In 1988, the direct land tax in Xinxiang was raised to an average of 12 kgs per mu of wheat equivalent and the wheat quota price also was raised to 0.59 yuan per kilogram.⁵ It is noteworthy that the new direct tax rate of 7.08 yuan per

⁵ The data on direct land tax are from Xinxiang Grain Marketing Reform Program Packages: "Program Outline" Xinxiang City Government, May 1988.

mu was about the same as the imputed total land tax in 1987. This suggests that if the market prices had not increased in 1988, the policy objective of eliminating the implicit taxation (as described in Chapter Five) should have been achieved. Nevertheless, the market prices in 1988 in effect increased rapidly. The gap between market price and quota price remained in the same order as before, hence the issue of the implicit taxation.

B.3 Wheat Quotas as a Binding Constraint?

Quotas not only directly reduce household income, as a marketing constraint it may also alter household resource allocation. If the quota is not binding; that is if household marketable surplus is greater than the quota delivery requirement, its resource allocation would still be guided by market prices. In this case quotas would only affect household behavior indirectly through income. On the other hand, if the quotas are binding, then they would not only alter household income but also cause households' shadow prices to diverge from market prices. Quotas in this case can have a direct effect and artificially raise household production and sales of the commodities subject to quotas (Sicular 1988, p.299).

How seriously did the wheat quotas act as a binding constraint on households' marketings? Households whose quota targets are sufficiently high would not be able to participate in additional market trade. One proxy of indicating how often the quotas are binding constraints is the number of households whose delivery of wheat quotas is less than or equal to the targets and who do not sell any additional quantities through open market trade. Table 6.6 shows that 62 households (41 percent of the

sample) had delivered wheat quantities less than or equal to the quota targets and did not sell any additional amount to markets. Only one household underfulfilling the wheat quotas by some amount sold to markets. The result of about a half of the sample households whose wheat marketable surpluses were constrained by the quota targets suggests that quotas might be a serious distortor of farm resource allocation.

It is also interesting to note that eight households not selling any to the markets in fact overfulfilled quota targets by some small margin. The reasons for this is not entirely clear. Possible explanations are that for these households, they might not have weighed their quotas at home before delivery, or perhaps more importantly that there are costs of engaging in two separate transactions (see Chapter Five for the discussion of free market transaction costs).

Table 6.6
Distribution of Number of Market Sellers and Non-sellers
by Wheat Quota Fulfillment Rate, 1987/88

	Wheat Quota Fulfillment Rate				Total
	< 70%	70%-99%	100%	>100%	
Sellers	0	1	63	16	80
Non-sellers	2	5	55	8	70

Source: Farm Survey.

C. Patterns of Wheat Sales to Open Markets

The remainder of this section addresses how those households who sold additional surplus beyond quotas had access to markets. This part of the study complements the description in Chapter Five regarding the viability of free market operations and provides a detailed micro-perspective from the farmers' standpoint.

In Chapter Five, we noted that local assembly markets in Xinxiang were pushed close to the farmgate or to the village levels. This was explained in terms of increased competition among traders in trying to obtain a large market share in assembly markets. The farm survey results support this observation (Table 6.7). The results show that two thirds of the wheat market sales were assembled and sold at the village level.

Table 6.7
Importance of Different Marketing Outlets by Sales Level, 1987/1988

Sales Level	No.of Farms	Avg Sales (kg)	Percent of Sales to			Distance To Near Markets (km)	Average Price Received (Y/kg)
			State Buying Stations	Village Assembly	Periodic Markets		
100 kg							
< 1	4	70	50	50	0	9.8	0.56
1 - 5	29	367	24	61	15	6.9	0.58
5 -10	22	736	17	59	24	5.9	0.58
10 -20	18	1633	3	84	13	5.0	0.59
> 20	7	2936	0	76	24	4.6	0.60
All/Avg	80	963	17	67	16	6.2	0.58

Source: Farm Survey.

Table 5.7 shows that overall there is a negative relationship between the wheat market sales and the market distance. The question of market access in relation to wheat sales will be further explored in Chapter Seven where several proxies for market access variables including the market distance are included.

Households with large sales tended to sell a lower proportion to the state buying stations. This observation may be explained as follows. The state buying stations are located in township seats, so moving the surplus wheat from farms to the the buying stations involves transportation and labor time. Since village level assembly by private traders offers a feasible alternative, and it saves farmers transportation costs, sales at the village level is an attractive market channel. In addition, the cumbersome sales routines at state buying stations such as long waiting lines and quality inspection may also discourage farmers from physically moving surplus for sales at the state buying stations.

Households with large sales also tend to sell relatively more in the periodic markets. The field study indicates that the periodic markets offer an alternative market channel to village level assembly. More importantly as suggested during the farm interviews, households selling in the periodic markets were interested in seeking the market price information and in direct bargaining with buyers.

The higher proportion of sales to the state buying station by households with a small level of surplus sales can be explained if we consider the following factors. Rural township seats host many commercial stores where farmers buy daily groceries. When they purchase such items, they usually carry a small quantity of surplus wheat (or other home

produced products) to sell to the state buying stations, using the cash paid to buy these daily items (see Chapter Five).

The last column in Table 5.7 shows the average prices received by households of different levels of total sales. Small sale households received a relatively lower price than large sale households. Nevertheless, this price effect on wheat market sales should not be taken lightly, as the results also show that the farm level selling prices are negatively related to the market distances. The differential impacts of prices and market access will be further explored in Chapter Seven.

Table 6.8 presents the bi-monthly sales pattern during the wheat marketing year from July 1987 to June 1988. Shortly after the wheat harvest, farmers were very active in selling their wheat surpluses; this is revealed by the fact that a relatively high concentration of sales occurring in July and August and the amount sold in these two months was close to 40 percent. This active market participation on the part of farm households lasted for the first half of the marketing year; during this period about 72 percent of the total volume of sales were transacted and about the frequency of sales was about three quarters of total number of sales for the entire marketing year (from July 1987 to June 1988).

March and April saw another peak of wheat sales, receiving about 18 percent of the total sales. This second concentration of sales may be explained by the following. By that time in March and April, farmers may have a fairly updated idea on the prospects of the next crop. Concerned with the balance between the household food security and need for cash income, farmers with good wheat prospects would like to sell the previous stocks. This temporal marketing pattern indicates that for some farm

households a portion of wheat production would be stored for up to eight to nine months before sales.

Table 6.8
Bi-Monthly Wheat Market Sales Pattern for the sellers
from July 1987 to June 1988

Month	Sales Freqn #	Quantity Sold (1000kgs)	Per Cent of Sales %	Avg Kgs per sale (kg)	Avg Market Prices (Yuan/kg)
J-A,87	49	30.08	39	614	0.56
S-O,87	15	13.38	17	955	0.59
N-D,87	11	11.56	15	1051	0.59
J-F,88	5	3.20	4	640	0.58
M-A,88	15	14.09	18	939	0.61
M-J,88	7	4.85	6	692	0.63
All/Avg	102	77.16	100	764	0.58

Source: Farm Survey.

Table 6.9 shows the frequencies of alternative use of cash incomes that households reported from the wheat market sales. Purchasing modern inputs such as fertilizer, seeds, and pesticides is the main use of the sales incomes. Other frequently cited uses of sales income include supplementary money for purchasing large farm machinery, payment for building houses, and daily household expenses. It appears that these uses of cash income, especially the farm variable inputs, require timely cash availability, which might discourage farmers' speculative concerns in wheat marketing.

Interestingly, no households reported the use of wheat sales income for payment of local levies. The interviews with farmers indicate that the village officials collected local levies by deducting directly from the farmers' wheat quota sales income at the time when they delivered the quotas. So the cash income of quota sales farmers actually received was reduced. Consequently, although farmers did not sell extra wheat to pay for the local levies, the indirect effect of local levies on wheat sales can be seen, as the need for other uses of cash income prompted farmers to sell more.

Table 6.9
Sales Frequency by the Income Usage in
1987/88 wheat marketing year.
(Total Number of Sales = 102)

Use of Sales Revenue	Frequency	Use of Sales Revenue	Frequency
1. Operating Inputs	41	6. Bank Deposits	5
2. Machinery Purchase	16	7. Ceremonies	4
3. Daily Expend.	15	8. Payout Loans and Borrowings	3
4. House Constr.	11	9. Others	1
5. Service Charges.	6	10. Local Levies	0

Source: Farm Survey.

D. Household Wheat Stocks Position

Farmers' holding of wheat stocks reflects their stock management and their household food security situation. The farm survey does not have complete information on households' monthly wheat flow and stocks, but the

available data on wheat stocks at two points of time during the 1987/88 wheat year indicates that this concern is effective (Table 6.10). In February of 1988, a very high percentage of households had wheat in storage despite the seasonal highest price in this month (see Figure 5.5a in Chapter Five). The exception is the small households for which only 80 percent had wheat stocks. The average wheat stocks per capita were sufficient for farmers to consume until the next harvest in June. It is interesting to note that even by June of 1988, when the new crop was about to be harvested, half of the sample households were still storing wheat, although the average quantity in storage per capita was relatively low as compared to that in February.

Table 6.10
Household Wheat Storage Status Before and After Harvest
by Farm Size and County in 1988

	All	Farm Size, mus					Huixian	Yuan- yang
		< 5	5-10	10-15	15-20	>=20		
Post-harvest (Feb. 1988)								
% of HH storing	94	81	95	96	93	100	89	100
kgs in stock								
per capita	132	135	128	132	146	129	149	115
Pre-harvest (June 1988)								
% of HH storing	56	44	49	63	60	100	44	66
kgs in stock								
per capita	63	51	63	75	51	35	84	51

Source: Farm Survey.

6.2 Observations of Household Wheat Production and Consumption

To further the understanding of household marketing behavior we need to examine determinants of the household wheat production and consumption. This section identifies the household resource endowments and resource allocation in wheat production, and describes the characteristics of wheat production and consumption behavior.

A. Household Resource Endowments

Family Size and Labor Availability Both household size and family labor are important factors related to wheat production and consumption. Household size defines in part the level of wheat output retained for home consumption and family labor availability combined with other production factors, determines the household wheat production possibility.

The survey data on the sample distribution of household size and labor availability of the sample farmers (Table 6.11) show that average family size and average labor available are 5.2 and 3.7 members per household, respectively. The results compare closely with that from a national rural survey conducted by the State Statistical Farm Survey Network in 1987. In the latter case, the average family size and average labor available are 5.0 and 3.0 members per household.⁶ A majority of the farmers (80 percent of the sample) have an average family of four to five members per household.

⁶ The China State Statistic Bureau 1987 Farm Survey Summary, 1988, p.19

Table 6.11
Distribution of Family Size and Labor Availability, 1988

Size Stratum	# HH's	% of Ttl HH	Family Size		# Family Laborers		Dependency Ratio
			Mean	Std	Mean	Std	
1 - 2	3	2	1.7	0.6	1.3	0.6	1.3
3 - 4	58	39	3.8	0.4	2.6	0.8	1.5
5 - 6	62	41	5.4	0.5	3.8	1.3	1.4
7 - 8	20	13	7.3	0.5	5.4	1.8	1.4
> 8	7	5	9.9	0.7	7.9	1.2	1.3
Ttl/Avg	150	100	5.2	1.7	3.7	1.8	1.4

Note: Family labor includes male members of age 14 to 65 and female members of age 14 to 60 who live with the family permanently.

Source: Farm Survey

The data also show that the average ratio of household size to labor available appears similar across the household strata. Nevertheless, the larger household stratum has greater variation in numbers of family laborers, even though the variation of household size is similar across different strata. A large size household with small labor force may have a higher dependency ratio. Provided that farmers are self-sufficient in grain consumption and are concerned with household food security, such households tend to have less surplus grain for sale. On the other hand, a larger household with more labor force available for production may be able to sell more surplus grain.

Farm Size (Land Use Rights) Land in China is not private property. With the introduction of the Household Responsibility System (HRS) since 1979, farmers now are granted user rights to a certain amount of state

owned land for a number of years. In the case of crop land, user rights are assigned for 15 years or fewer according to the recent national policy. Two general criteria governs the assignment of user rights. One is the size of a farm household. A large household obtains a large amount of land and vice versa. The other is the number of family laborers in a household. However, choice of either assignment rule is a practical matter. The assignment is usually implemented within a village boundary. The total village cultivated land is divided and distributed to village households according to either criterion, or more often a combination of the above two criteria.

There are cases of user rights transfers among households. Households who have better access to off-farm employment may want to lease some of their land and others with insufficient land may want to rent additional land. The survey data indicate that only a small number of households have engaged in this type of activity. During the 1987/88 production season, 10 out of the 150 households rented average of 3.1 mus, accounting for 35 percent of their total cultivated land. No formal rent agreement was negotiated. A significant part of the transfer agreement was for the rentee to fulfill the state quota delivery requirement on the rented land. Also, virtually all the land transfers were among family relatives, and the duration of the agreements was very short. In addition to the amount of the collectively owned land granted to them through user rights, farmers usually have some small private plots. These plots have remained with the households long before the Household Responsibility System was introduced.

Since the private plots averaged no more than 10 percent of total cultivated land per household, the following discussion will not single this out, nor the meager practice of private land rentals. But the data on total farm size does account for both private plots and the net transfer of land user rights.

The stratified results on the distribution of farm size (Table 6.12) show that the average farm size per household is 10 mus; 43 percent of the households hold 5 to 10 mus per farm; and 33 percent are in the range of 10 to 15 mus per farm. While overall farm size is small, variation at the household level is evident. The average farm size per household in the highest stratum is more than five times as large as in the lowest stratum. Even after taking account of the difference in household size and number of family labor available, there remains some inequality of farm size both at the per capita and per laborer levels. This result suggests looking at differential impacts of policy on grain production and marketing responses by different-sized farms.

Table 6.12
Sample Distribution of Farm Size, in Mus, by Summer 1988

Size Strata	# HH's	% Ttl HH	Avg Land Size	Land Per Member	Land Per Family Labor
< 5	16	11	4.1	1.1	2.0
5 -10	65	43	7.5	1.6	2.9
10 -15	49	33	11.9	2.1	3.3
15 -20	15	10	16.9	2.3	3.9
>= 20	5	3	22.6	3.4	4.1
Ttl/Avg	150	100	10.0	1.9	3.1

Source: the Farm Survey Data.

B. Sources of Household Cash Income

Complete information on household financial situations is difficult to obtain for farmers often do not want this to be revealed. The farm survey identified a number of major sources of household cash income. The cash income provides a measure of the households' commercial orientation in different economic activities and subsequently the relative dependence of household cash income on these alternative economic activities.

The sample farm households engage in a variety of economic activities. Cash incomes consist of the earnings from lines of activities such as grain sales, cash crop sales, livestock and poultry marketing, and off-farm wage earnings and the remittance from their relatives. The grain crops mainly include wheat, rice, and corn. Cash crops are very diverse and include cotton, oilseeds, lily flower, vegetables and fruits. Two main activities of off-farm employment are transportation and wage labor in housing construction. As compared to other areas in China, rural small scale industries in the study areas are relatively underdeveloped. All households in the sample reported grain sales. Fifty five percent of the households reported some income from cash crop sales; 69 percent earned cash from livestock and poultry marketing. About 28 percent of the sample indicated they had income from off-farm work opportunities and remittances.

Grain sales were by far the most important source of cash income for the sample farmers (Table 6.13). An average of 72 percent of total cash income was derived from grain sales. Evidently the share of grain sales income increases as the farm size increases. For most of the sample households wheat sales income accounted for more than 15 percent of the

total cash income. The exception was for those with farm size greater than 20 mus, for whom wheat sales was 7 percent of total cash income. The household dependence on grain sales and wheat sales thus is crucial to its living standards.

Table 6.13
Sources of Alternative Cash Incomes by Farm Size, 1987/88

Size Strata	# HH's	Total Cash Income (yuan)	Percent Share from				
			Grain	(wheat)	Cash Crops	Livestk Poultry	Off-Farm
< 5	16	1160	40	(19)	3	35	22
5 -10	65	1562	60	(26)	13	16	11
10 -15	49	2852	75	(24)	11	10	4
15 -20	15	4932	82	(14)	9	4	5
>=20	5	6739	95	(7)	0	3	2
Ttl/Avg	150	2450	72	(21)	10	11	7

Source: Farm Survey

The results also show that on the average, cash crop sales accounted for 10 percent of the total cash income, livestock and poultry marketings for 11 percent, the off-farm employment plus remittances for 7 percent. The relative importance of alternative cash incomes also varies by farm size. The incomes from marketing of livestock and poultry and off-farm income earning activities are more important to small farmers as compared to the large farms.

The significance of grain sales income for the sample households indicates that an effective grain marketing system with easy market access and remunerative prices would be important to strengthen the well-being of a majority of farm households and could provide additional incentives

for increased investment in grain production. In the case of wheat, even though the current quota delivery system has provided a stable farm cash income, with the quota purchase price below market prices the system also reduces cash income for most households.

C. Wheat Production Characteristics

C.1 Wheat Sown Area in Farm Land

Table 6.14 presents the information on farmers' land allocation to three major grain crops in 1987/88. The double cropping pattern is shown by separate land allocation for the winter/spring and summer/fall seasons. The results show that farmers allocated the largest proportion of land for the production of wheat, rice, and corn. Examining the winter/spring cropping in particular, 80 percent of the cultivated land was devoted to wheat production and the remaining 20 percent to fallow and possibly to other minor crops.

This observation on land allocation pattern is explained in that few crops are suitable for growing in the winter/spring season. While barley is among the few crops having the same growing season as wheat, most farmers in the sample do not grow it for three reasons. First, far fewer farm households consume barley as compared to wheat because barley is now considered as an inferior good. Second, barley is not required in the grain delivery program. Third, barley's market price is lower than wheat price. It is necessary to point out that during the farm survey, some farmers indicated that they did grow some barley. The main reasons for growing it were the following. First, the barley harvest time is a little

earlier than that of wheat. So the land can be cleared in time and be ready for planting the second season crops, and second, others grow some barley for animal feed.

Table 6.14
Percent Share of Farm Land Planted to Different Grain Crops
by Farm Size and County, 1987/88

Size	Average Farm Size	<u>Winter/Spring</u>		<u>Summer/Fall</u>		
		Wheat	Other Crops or Fallow	Corn	Rice	Other Crops
	mu	-----	Percentage	-----	-----	-----
< 5	4.1	78	22	50	20	30
5 - 10	7.5	81	19	50	19	31
10 - 15	11.9	80	20	42	36	22
15 - 20	16.9	68	32	27	56	17
>=20	22.6	61	39	0	97	3
Total	10.0	79	21	44	33	24
HuiXian	9.3	88	12	82	0	19
YuanYang	10.1	71	29	10	61	29

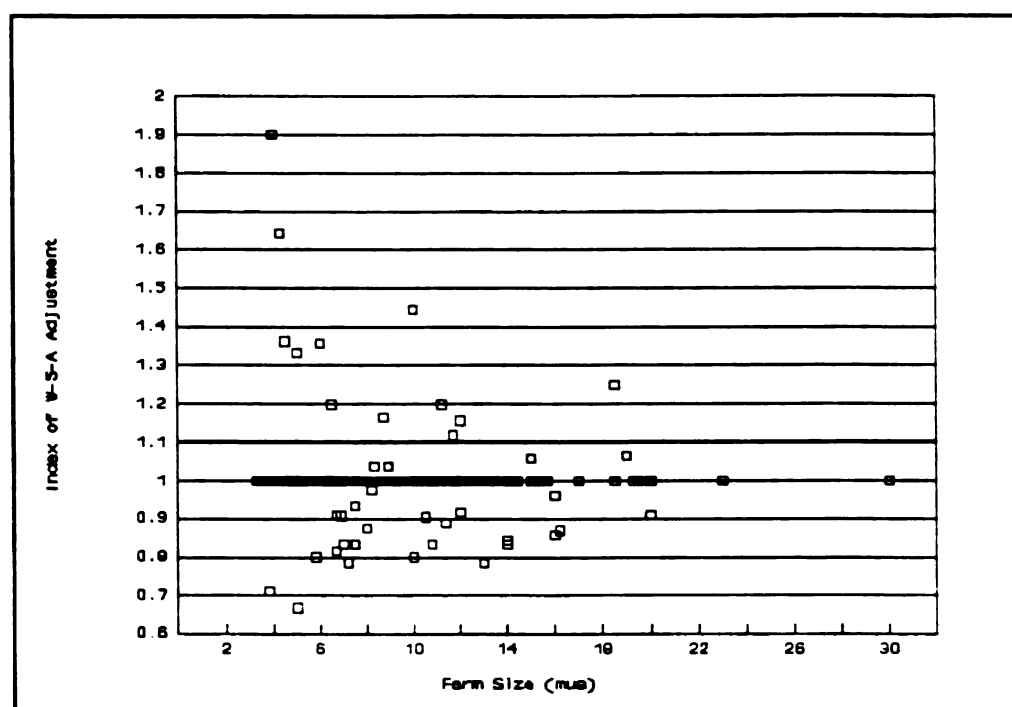
Source: Farm Survey.

Another observation from table 5.14 is that the percent share of the cultivated land devoted to wheat production is relatively stable for most of the farms, with the exception for some large farms. One conjecture for the large farms devoting a smaller share of land to wheat is that, once having planted "enough" land to wheat primarily for the concerns of quota delivery and home consumption, these large farms may likely fallow the remaining land to plant the more profitable crops like corn and rice in the next season. This conjecture has not been empirically examined.

It should also be pointed out that among the sample households, there has been some variation over time in the absolute amount of land devoted

to wheat production. By dividing the amount of wheat sown areas in the current year by that in the past year, the resulting index is defined as the wheat sown area adjustment index over time. Plotting out this index by farm size, Figure 6.1 shows that small farms (with the farm size less than five to six mus) tended to experience some larger adjustments in wheat areas, although the number of households with the large adjustments were small. Most households were the medium sized farms. The absolute degree of their adjustment was in a range of 15 percent up or down of their original wheat sown areas in 1987.

Despite the possibility of wheat sown areas adjustment over time, the fact that a high percentage of land is already in wheat production suggests the following. If the relative price of wheat increases, a positive supply response would have to be mainly in terms of increases in wheat yields, which in part would reflect the increased use of production inputs such as fertilizer, labor, etc. Further improvement of production technology, increased attention to production management, the input supply distribution system, and the output marketing system are some important factors complementary to the price policy in order to bring about a positive supply response.



Source: Farm Survey, 1988

Figure 6.1 Index of Wheat Sown Area Adjustment by Farm Size, 1987/88

C.2. Production and Per Capita Availability

Table 5.15 presents the information on farm characteristics of wheat production and per capita availability for the sample households. The farm strata in this table are based on the volume of wheat production per farm. The results show that there is an inverse relationship between the percent share of sample households and the share of total volume of wheat produced. While 15 percent of households in the bottom strata produced about 5 percent of the total volume of wheat, about 16 percent of the households in the fourth and fifth strata produced the 30 percent of the total volume. Further, a significant difference exists regarding the per capita wheat availability across households. While the average wheat availability per capita is about 428 kgs for the entire sample, 21

Table 6.15
Select Farm Characteristics of Wheat Production and
Per Capita Availability by Production Level, 1987/88

Items	Units	Production level, kgs					ALL
		I	II	III	IV	V	
		<1000	1000 - 2000	2000 - 3500	3500 - 5000	>5000	
Number of Farms		21	55	61	21	2	150
Total Volume of Production	1,000 kg	16	80	131	88	11	326
Percent Share	%	5	24	40	27	4	100
Average Production Per Farm	kg	758	1445	2565	4213	5760	2175
PC Production	kg	231	321	510	667	837	428
Post-Quota PC Wheat Available	kg	167	244	406	544	718	337
PC Wheat Consumption	kg	156	164	186	165	143	170
Land Size per farm	mu	6	9	11	14	15	10
Wheat Area per farm	mu	4	6	9	12	15	8
% of Wetland on Farm	%	43	45	36	19	0	37
Average wheat yield	kg/mu	238	249	288	343	380	276

Source: Farm Survey.

households in the lowest production stratum have about 187 kgs less than the sample average. In contrast, 23 households in the two highest strata have about 250 kgs or larger than the sample average. This pattern of the difference in per capita wheat availability remains after the requirement of wheat quota delivery is considered. For the households in the lowest production strata, the per capita wheat retained after the quota is barely enough for home consumption. On the other hand, the households in the higher production strata have varying amounts of extra wheat, from 80 to 574 kgs per capita, available for potential discretionary sales.

The average level of wheat production is closely related to the farm size, amount of cultivated land devoted to wheat, and the average yield per farm. Households in the lowest production stratum are apparently small farmers; their average farm size is about six mus per farm. They devoted an average 60 percent of cultivated land to wheat production. In contrast, the large farms devoted 90 percent or more of their cultivated land to wheat. A positive correlation coefficient of 0.89 is obtained between farm wheat production and the sown area.

Further examination of the results indicates that the percentage share of cultivated land allocated to wheat is inversely related to the amount of wetland endowment per farm. As wheat grown on wetland is vulnerable to flood damage during the rainy season in April and May, the amount of wetland on a farm tends to partially dictate the amount of land allocated to wheat. The data also suggests that mostly it is small farms which have a higher proportion of wetland and allocate smaller amount of its land to wheat. Nevertheless, about one fifth of the total households in the sample are endowed with all of their cultivated land classified as

wetland. Since they allocated at least a half of the land for wheat production, they are therefore the most vulnerable group to flood damage.

The issue of how farms' wheat production level is determined by the various factors including farm characteristics, production technology, fixed variables, and variable input used will be examined econometrically in Chapter Seven.

C.3 Yield Instability and Public Services Provisions

The results in Table 5.15 suggest that as households have allocated a large share of farm land for wheat production, further increases in wheat output would likely result from the increase in wheat yield. The yield increase would in turn imply a potential demand for high-yielding wheat varieties and increased use of modern inputs. But how effective is the demand by farmers? It is characteristic that some of the modern inputs may not only increase the mean yield but also increase the yield variations. The farm survey results indicate that the high yield variability must be taken into account when considering alternative ways of increasing wheat yield.

The farm level data in the sample provides some empirical information on the extent of wheat yield variability and some underlying reasons for this variability. The farm survey inquired about highest and lowest wheat yields on each farm in the past six years since 1983 when the Household Responsibility System was fully introduced in the area. Using the time-series data, Table 6.16 constructed two approximate indicators of wheat yield variability and presented the relative importance of causes for the variations.

Table 6.16
Wheat Yield Variations and the Important Causes Mentioned
by Farm Size during 1983 and 1988^a

	All Sample	Farm Size Groups				
		< 5	5 -10	10-15	15-20	>=20
Average Yield, kg/mu	316 (67)	321 (34)	335 (54)	310 (79)	273 (76)	242 (18)
Two Measures of Yield Variations						
Absolute Difference of Highest-Lowest Yld, kg	84 (54)	77 (50)	89 (54)	76 (51)	89 (67)	104 (47)
% of the Yld Difference to the Lowest Yield	52 (78)	36 (30)	41 (30)	48 (63)	109 (191)	117 (123)
Percentage of Farms by Causes of Yield Variations ^b						
1. Wheat Variety	4.2	0.0	4.7	4.4	0.0	25.0
2. Weather Factor	14.1	13.3	15.6	13.3	14.3	0.0
3. Insect and Pest	5.6	0.0	1.6	15.6	0.0	0.0
4. Fertil Supply/Applic'n	24.6	46.7	20.3	22.2	35.7	0.0
5. Irrigation/Water Supply	40.1	40.0	51.6	28.9	21.4	50.0
6. Others	11.3	0.0	6.3	15.6	28.6	25.0
Number of HHs Reported	142	15	64	45	14	4

^a Figures in parenthesis are standard deviations.

^b Figures refer to the column percentages.

Source: Farm Survey.

The results show that the average wheat yield decreases as the farm size increases. The absolute difference of highest and lowest yields was about the same magnitude, except for the largest farm households. On the average, the absolute yield difference was about 27 percent of the average yield (84 kgs divided by 316 kgs times 100). Nevertheless, because of the low average yield for the large farms, the relative degree of yield variations was significantly larger for the large farms as opposed to small farms. Interpreted in a different way, this result indicates that there could be some large potential for those large farms to maintain a stable and high wheat yield.

Several important causes of the yield variability over time were related to (1) weather factor, (2) fertilizer supply situation and its appropriate application, and (3) irrigation infrastructure and adequate water supply. A number of farms also mentioned the lack of technical assistance as a cause which was lumped in the category "others". The results show that about 40 percent of the farms' responses was related to the problems of irrigation infrastructure and water supply, another 25 percent of the responses concerning problems of fertilizer distribution and appropriate application.

It is important to note that these farmer-reported causes of yield variations are in one way or another related to the "public goods" type of investment in the rural areas. The above results concur with the current discussion of agricultural policies regarding the production sustainability in China. These discussions (e.g. Lardy 1987, James Wen) pointed out that since the Household Responsibility System was implemented the state investment in agricultural sector has decreased, while private

incentives for agriculture-related investment have not been adequately fostered. The individualized farming system may have also undermined the proper attention to group actions related to maintaining and improving the rural infrastructure such as the irrigation system and farm production technical assistance. The data limitation prevents us from conducting a comparative study - before and after the HRS - of the degree of yield variations and causes of the variations, although the above results from the sample farms suggest that an increased attention be paid to these "public goods" type of investment.

D. Wheat Consumption Characteristics

Household grain consumption in the study area is composed of wheat, corn, milled rice, and other minor items. Wheat flour and milled rice are considered as fine grain, corn meal and other items as coarse grain. Using levels of wheat consumption as the group strata, Table 6.17 provides information on (1) the relative share of different types of foodgrains consumed and (2) several key indicators of household wheat consumption characteristics. The results show that wheat accounted for more than 70 percent of total grain consumption per household and the remainder is supplemented by corn, milled rice, and others. All groups generally maintain the importance of wheat as a major consumption item, while the relative share differs across groups. In particular, the results show that there is some substitution of corn for wheat across the different consumer groups, while rice and other minor grains appear to be complementary foods.

Table 6.17
Select Household Characteristic of Wheat Consumption by
the Consumption Level, 1987/88

Items	Wheat Consumption Level, kgs					ALL
	I <500	II 500 -1000	III 1000 - 1500	IV 1500 - 2000	V >2000	
Number of Households	12	60	48	25	5	150
Average Quantity of Grain Consumed, kg	590	1004	1594	1975	2750	1380
Percent Share in						
(1) Wheat	70	72	74	82	80	74
(2) Corn	21	16	16	8	6	15
(3) Milled Rice	6	10	8	9	13	9
(4) Others	3	2	2	2	1	2
Wheat Consumed per HH, kg	410	708	1154	1592	2200	1024
Wheat Production net of the quota per farm, kg	958	1004	1908	2098	2726	1712
Household Size	3.8	4.3	5.6	6.6	8.4	5.2
Wheat consumed per adult- Equivalent Member ^a , kg	150	211	263	302	340	242
Per capita --						
Total cash income, yuan	323	507	446	603	627	493
Non-wht cash income, yuan	253	381	339	531	541	388

^a The adult-equivalent family size is calculated as sum of the reported number of family laborers and the non-laborers discounted by 50%.

Source: Farm Survey.

The results also show that the amount of wheat consumed at home is related to, among other things, the level of wheat output (net of the quota delivery), household size and the household cash income earnings. Higher wheat output on farm leads to a higher home consumption. Evidently the household size also has a positive relationship to the level of wheat

consumed at home. After taking into account the effect of household size, the wheat consumption per adult-equivalent consuming member also appears to be positively related to farm output and household income.

While the above results (1) indicate the significance of wheat in household grain consumption and (2) point out some factors which likely have impacts on the level of wheat consumed, they do not show the differential impacts of these and other factors on the levels of wheat consumed. Chapter Seven will provide a regression analysis on this issue.

6.3 Farmers' Attitudes about Wheat Surplus Sales

This section discusses some results on farmers' attitudes toward wheat surplus sales should they face a potential change in wheat production or in wheat market prices. The farm survey asked the household heads three independent questions. The questions were structured so that farmers only had a choice of "yes" and "no".

(Q1) "Suppose the wheat production on your farm is to increase, what would you do with this increase? Sell it or choose not to?"

(Q2) "Suppose the wheat market price now increases, what would you do? Sell more wheat surplus now in storage or hold it and wait?"

(Q3) "Suppose the wheat market price now falls, what would you do? Sell more surplus currently now in stock or choose not to sell?"

The results so generated are very preliminary. However, the purpose of this investigation was to see how different factors act as the driving forces underlying the responses to changes that are different in nature.

Table 6.18 suggests that when an increase in output is experienced,

the current levels of wheat output have a significantly positive effect on whether a farmer decides to sell or not. The output increase over an already high level of wheat produced would go for sale. And the would-be sellers actually sold significantly larger amounts of surplus wheat in the period of 1987/88 wheat marketing year.

Table 6.19 shows that when an increase in market price occurs, the characteristics between potential sellers and non-sellers differ from the case when there is an expected increase in wheat output. Farmers with large wheat output are likely to hold on to the surplus rather than release it immediately. For these households, the amount of wheat sold in the 1987/88 wheat marketing year was significantly larger than those who would like to sell immediately in response to price increase. Several reasons (or hypotheses) can be offered here. The would-be immediate sellers may want to quickly capture the gains due to the price increase, possibly because their non-grain income is small. On the other hand, households that would wait may forego the immediate price gain in anticipation of a further increase in prices. In this regard, we see that there are significant differences between the two groups regarding their education levels and farming experiences, which may have affected their formulation of price expectations.

Table 6.20 shows that when expecting a fall in market prices, most farmers would like to hold to their surplus. This result is reasonable as farmers want to avoid an income loss. While those farmers who had sold a significantly larger amount may still stay in the markets as sellers, a majority of the actual sellers during the 1987/88 reported that they would cease to sell.

Table 6.18
Comparison of Characteristics Between Sellers and Non-sellers
in Response to Question One

Charateristics	Units	Sellers	Non-sellers	T Values
Number of Farms	#	68	82	
Education Level	Years	7.3 (3.5)	6.9 (2.9)	0.77
Farming Experience	Years	21.5 (12.3)	19.3 (11.6)	1.14
HH Size	#	5.2 (1.7)	5.1 (1.7)	0.35
Current Prod'n	1000kgs	2.4 (1.2)	1.9 (1.2)	2.37
Wheat Consump'n	1000kgs	1.0 (0.4)	1.1 (0.4)	-0.25
OpenMkt Sales	100kgs	7.2 (8.0)	3.4 (7.0)	3.00
Non Grn Income	100Yuan	7.3 (7.2)	6.3 (5.3)	1.05

Table 6.19
Comparison of Characteristics Between Sellers and Non-sellers
in Response to Question Two

Charateristics	Units	Sellers	Non-sellers	T Value
Number of Farms	#	86	57	
Education Level	Years	6.2 (3.1)	8.0 (3.1)	-3.44
Farming Experience	Years	21.6 (12.5)	17.7 (11.6)	1.84
HH Size	#	5.1 (1.7)	5.3 (1.6)	-0.58
Current Prod'n	1000kgs	1.9 (1.2)	2.4 (1.2)	-2.07
Wht Consump'n	1000kgs	1.3 (0.5)	1.4 (0.5)	-0.81
Open Mkt Sales	100kgs	3.1 (6.1)	7.7 (9.2)	-3.59
Non Grn Income	100Yuan	6.2 (7.2)	7.6 (4.2)	-1.28

Table 6.20
Comparison of Characteristics Between Sellers and Non-sellers
in Response to Question Three

Charateristics	Units	Sellers	Non-sellers	T Value
Number of Farms	#	27	117	
Education Level	Years	7.6 (3.8)	6.8 (3.1)	1.18
Farming Experience	Years	18.0 (10.8)	20.5 (12.5)	-0.95
HH Size	#	4.9 (1.9)	5.2 (1.6)	-0.66
Current Prod'n	1000kgs	2.5 (1.3)	2.0 (1.2)	1.74
Wht Consump'n	1000kgs	0.9 (0.4)	1.0 (0.4)	-1.70
Open Mkt Sales	100kgs	10.5 (10.6)	3.7 (6.4)	4.09

Source: Farm Survey Data.

6.4 Chapter Summary and Implications

This chapter provided a descriptive analysis of household wheat quota delivery performance, household experience with open market sales, and the characteristics of household wheat production and consumption. The unique role of the wheat crop in farm economic activities in the study area has given rise to some important observations in understanding opportunities and constraints of farmer responses to changes in the marketing system.

Wheat was the only crop subject to state quota obligations at the time of this study in Xinxiang. During the past several years, the wheat quota quantity had increased substantially despite a reduction in the total quantity of grains procured by the state. The wheat quotas were consequently becoming a more stringent marketing constraint. The results showed that for about 40 percent of the households, the wheat marketed surpluses were less than or equal to the quota targets.

The quota deliveries had an adverse effect on household incomes because of the low quota purchase price as compared to the market prices. The income loss due to the low price was an implicit tax and was estimated to be 85 percent greater than the direct land tax in 1987. In 1988 the Xinxiang government increased the wheat quota prices and at the same time raised the direct land tax rate in an attempt to reduce the implicit taxation due to quota procurement. Nevertheless, this policy change might have had a very modest (if any) success on reducing the quota income loss. The survey results showed that the market prices were increasing rapidly throughout 1988 and the gap between the quota price and market price remained in the same magnitude as before. The government also attempted

to use various incentive programs such as the subsidized input supply and credit advances to encourage farmers to grow wheat and deliver to the state. Such programs were not very successful mainly because of the practical difficulties and the costs associated with administering and enforcing the effective implementation of these incentive programs.

About 60 percent of the households sold some amount of wheat in the open markets during the 1987/88 marketing year, in addition to the quota delivery. The chapter examined their marketing behavior in terms of when to sell, where to sell, and why to sell. A large portion of the wheat was sold during the first three or four months after wheat harvest. This is mainly because of (1) the active local private assembly markets and (2) farmers' need for income to purchase the farm inputs preparing for the next cropping season. Furthermore, the majority of the wheat surplus was marketed at the village assembly level, attesting to the importance of this outlet relative to other alternative channels such as the state buying stations and rural periodic markets. The farm survey data suggests that the increased competition by private traders, the distance to travel and transportation costs might have shaped the households' wheat marketing in this fashion.

Wheat is the most important crop in household grain production activities. Wheat is sown on about 80 percent of the arable land in the winter and spring season. It also accounts for 74 percent of the total household grain consumption. The relatively high proportion of arable land sown to wheat suggests that any price-induced output increase will come largely from increases in wheat yields. The average wheat yield in the area is already relatively higher than the rest in China, reflecting

an absolute advantage of wheat production in this area. Nevertheless, the farm survey data show that over the past several years, the sample farmers had experienced some large yield variations. Several important causes of the yield instability include fertilizer availability and its proper application, irrigation management and water supply, and weather conditions. While weather conditions are beyond human control, the first two factors might have been associated with the inadequate attention of policy makers in making these "public goods" type of investments in irrigation systems, efficient distribution of fertilizer supply and crop production technical assistance.

The high proportion of wheat consumed at home reflects the household preference for this product. This suggests that household wheat production and marketing decisions are likely to be significantly affected by the household food security concerns. The survey data suggests that the wheat stocks on farm might not be significantly affected by price speculation motives, but rather the insurance of a sufficient food supply for home consumption. For example, both in the post- and pre-harvest times, a relatively high proportion of households maintained wheat stocks that were estimated to be sufficient for home consumption.

The study also shows that the level of household wheat production was related to farm size, farm-level fixed inputs, and average yields. On the other hand the level of wheat consumption was related to the level of wheat output, household size, and household cash incomes. The differential effects of these and other factors on wheat production and consumption are to be further explored in the next chapter.

CHAPTER VII

A FURTHER ANALYSIS OF WHEAT MARKETING RESPONSES

Chapters Five and Six provided a detailed descriptive and diagnostic analysis of the effects of grain marketing reforms in Xinxiang. The analysis in Chapter Five on the organizations and operations of the local grain marketing system enhances our understanding of the viability of the grain marketing reforms. The market level analysis not only has important policy implications in its own right, but also sheds light on the external marketing opportunities that farm households take into account in their decision making. In Chapter Six the research focus shifted to the household level. Farm household economic resource and institutional opportunity sets were described and wheat production, consumption, and marketing activities were analyzed.

Based on the above descriptive analysis, this chapter develops a simple farm household model to (1) describe the likely impacts of several external and institutional factors on household wheat production, consumption and marketing decision makings and (2) using the farm survey data, to estimate econometrically the extent to which these various external and internal factors influence the household wheat activities.

7.1 Model Development and Two Estimation Approaches

A farm household is both a wheat producer and consumer. Hence the choice of levels of wheat production, consumption, and marketing are inter-related through price, output, and income effects. The model developed here attempts to show how the household reaches towards an equilibrium condition, given specified objectives and the resource and institutional constraints. Within this decision making framework, we can examine the effects of government policy actions such as a predetermined quota delivery and/or an input subsidy program on household response.

A. The Benchmark Model

A useful starting point for this exercise is to examine household behavior where the farm household faces no government policy actions. The following assumptions are made: (1) Wheat production is defined by a certain technology set. The farm maximizes net revenue from wheat production by applying variable factors on fixed resources (e.g., land). Some of the variable inputs are purchased (e.g., fertilizer). Both input and output markets exist. With these assumptions, the farm's wheat production is determined by the marginality rule such that the marginal value of wheat production from a variable input is equal to the purchase price of this input. (2) Given the level of net revenue from wheat production, the household consumption choice between wheat and other goods is governed by the utility maximization rule, such that the marginal rate of substitution between two consumption goods equals the relative prices of these two goods. (3) Two additional assumptions for the model are that

the wheat production is the only source of household income and that there is no difference between wheat selling and buying prices, that is the marketing margins are ignored. Under these assumptions, the benchmark model proceeds by solving the interdependent decisions of household wheat production and consumption decisions through the usual recursive approach (Singh, et al.). To be sure, these assumptions and the resulting solution approach imply that we are dealing with the case where all markets (including risk and contingent markets) exist and function well, so that there is no transactions cost or uncertainty.

The model is presented jointly in Figures 7.1 and 7.2. The first quadrant (I) in Figure 7.1 represents farm wheat production choice, where $Q_w = f(v; J)$ is the production function, Q_w is the wheat output, v is the variable input, and J is defined as the fixed input. Quantity of Q_w produced is determined by the first order condition of $P_w f'_v = P_v$. For example at the relative input and output price is P_v/P_w , Q_{w1} is produced (point A). With a more attractive relative price as P'_v/P_w , more wheat of Q_w is produced (point B). Thus by solving the net revenue maximization problem subject to the resource constraint, the household output supply function can be specified as the following: $Q_w = q(P_w, P_v; f, J)$, where f stands for the wheat production technology parameters.

Quadrant II in Figure 7.1 represents the wheat marketable surplus as a function of wheat production, parametric to prices, that is, $MS = MS(Q_w; \hat{P})$. As marketable surplus is defined as the residual of output supply and consumption, determining this functional relation needs to take into account the household's consumption choice upon the level of on-farm wheat production.

Figure 7.2 Household Consumption Choice Model

Figure 7.2 represents the situation of the standard consumer utility maximization problem, to illustrate the household's consumption choice. The horizontal axis in Figure 7.2 represents wheat consumption, C_w , while the vertical axis represents goods other than wheat, or "all other goods", C_{aog} . $\bar{C}_w$ indicates the household's minimum requirement for wheat consumption. The household indifference curves, I'_i , are drawn to reflect this minimum consumption requirement.

In the absence of non-wheat income, the net revenue from wheat production represents total budget available to household consumption allocation. A' and B' on the horizontal axis of Figure 7.2 indicate two different levels of net revenue in terms of units of wheat and they correspond to A and B of quadrant one in Figure 7.1. As the budget line moves from A' to B' , the household reaches D' at a higher level of indifference curve, I_1 . Its new consumption bundle is (C'_w, C'_{aog}) . As the budget line moves further out, $L(C_{aog}, C_w; Q_w, P)$ traces out the output expansion path. Increases in wheat output (or the income) will induce an increase in wheat demand due to the income effect. As the output level further increases, wheat demand will not increase at the same rate, provided that the wheat is a normal good and its consumption pattern follows the Engel's law. As a result, the higher level of wheat output would likely lead to an increase in the marketable surplus. This is shown by the positively sloped curve, $MS(Q_w; \hat{P})$, in the second quadrant of Figure 7.1.

Quadrants III and IV in Figure 7.1 are used for the accounting purpose of determining the levels of net cash income available for other consumption use. Implicit in these two quadrants are the following two

cases of household decision making. First (regarding the Quadrant IV), since we assume in this first model that there is no exogenous income for the household, the cash expenditures on wheat production using the purchased inputs would have to rely on external borrowing during the production season. Once the production season ends, the household would have to pay back the previously borrowed credit. Shown in Figure 7.1, for example, at the input price of P_v , the monetary expenditure cost for the production level B is OG along the income axis. The second case is for Quadrant III and also related to the consumption decision in Figure 7.2. If the farm household's indifference curve is shaped such that the household desires to consume more of the all-other-goods, that would lead it to sell more wheat in order to meet this higher desired demand of other consumption goods. Therefore, Quadrants III and IV are also endogenous to household decision making. To be sure, these two decisions of input use and other goods consumption, although interdependent, are separately solved assuming the existence of credit markets.

To complete the discussion of the benchmark model, let us consider the following example depicted from the two figures. Assuming the availability of variable inputs, v , and the relative price ratio of P'_v/P_w , the wheat output is to be Q_w (point B on the production function), the net return from wheat production is equal to $(P_w Q_w - v P_v)$. This net return serves as the budget constraint (B') in the consumption reallocation. D' is the point where the indifference curve is tangent to the budget line, from which C'_w is amount that the household desires to consume. As a result the $MS' = Q_w - C'_w$ can be read off from the marketable surplus curve in Quadrant II of Figure 7.1. Theoretically,

Strauss' approach (1984) can be used to derive the marketable surplus function from the output supply and wheat demand functions. Using the present notation, the Strauss approach is as follows:

Output Supply Function:

$$(7.1) \quad Q_w = q(P_w, P_v; f, J),$$

Consumption Function:

$$(7.2) \quad C_w = c\{P_w, P_{aog}, \hat{c}_w, z, \pi(P_w, P_v; f, J)\},$$

where $\hat{c}$ refers to the minimum wheat consumption requirement, z is defined as the household characteristics, and $\pi(.)$ is the output revenue net of the production costs. Using the identity of $MS_w = Q_w - C_w$, the above output supply and wheat consumption functions can be solved into the reduced form of MS_w , or $MS_w = ms(\hat{p}, \hat{c}_w, f, z, J)$, where $\hat{p}$ stands for a vector of market prices.

B. Empirical Additions to the Benchmark Model

The above model assumes away many important features of the household wheat supply and consumption situations in present day rural China, particularly for the study region. The following discussion focuses on three issues: input markets (especially the fertilizer supply), wheat quota delivery obligations, and grain market imperfections during the reform era. Other issues such as the farmers' non-wheat economic activities can be incorporated into the benchmark model by specifying the systems of output supply and consumption functions. In the present case of considering only wheat production and transaction decisions, given the

data available, these other household economic activities would have to be incorporated on the right-hand side of the wheat supply and demand functions, but acknowledging the problems of simultaneity bias.

As we discussed in Chapter Six, the fertilizer distribution system in the study area has become very complex as a result of the recent partial reform initiatives. Farmers, when they meet with the wheat quota targets, are in principle entitled to certain amounts of subsidized chemical fertilizer (typically urea). Any extra fertilizer demanded is to be met by purchasing in the fertilizer markets. For households whose subsidized fertilizer supply is non-binding, that is its desired use of fertilizer quantity is less than or equal to the subsidized quantity, then the subsidized fertilizer price would enter its production decision. For those households whose subsidized fertilizer supply is binding, that is, its desired use of fertilizer is greater than the subsidized fertilizer quantity, then the market prices of fertilizer would enter its production decision. In this latter case, the input subsidy policy would simply constitute a net income transfer to the binding households. As pointed out in Chapter Six, most of the sample households were not able to purchase the entitled subsidized fertilizer. Thus the market price of fertilizer such as urea and others would effectively enter the household production decision.

Farm households in rural China are required to deliver a certain amount of farm products to the state. In the study area, farmers are obligated to fulfill wheat quota delivery targets. The above discussed dichotomy of binding and non-binding constraints of the fertilizer use also apply to the wheat marketing cases. As we pointed out in Chapter

Six, many villages were allocated the wheat quota targets well after the production season had started. Consequently, the household production decision may well be determined by some type of market price expectations, which in turn are a function of quota allocations for households who may have non-binding quotas. The late allocation of quotas may affect the household consumption and free marketing decisions. Thus, for a household, his reduced form of free market sales (or purchase) would be the following:

$$(7.3) \quad MS'_w = Q_w - C_w\{P_w, P_{aog}, z, I\} - q_w,$$

where q_w is the wheat quota target, and I is the household income level which is defined as, $I = i\{E_0 - (P_w - P_q)Q_w + q_w P_q\}$, where E_0 refers to the household exogenous income, and P_q is the state wheat quota price which is usually lower than the market prices of wheat. By solving separately the output supply function and the wheat consumption function, the marketable surplus function can be determined as, $MS'_w = ms'(\hat{p}, z, f, J, I, q)$. Because of the income effect of wheat quota targets due to the difference between market price and quota price, it should be expected that with all other things being constant, the marginal response of free market wheat sales to changes in the quota targets is not a one-to-one correspondence and the effect may well be less than one. This is a testable hypothesis to be examined later in this chapter.

In the above discussion, we also assume away the issue of output market imperfections when considering the household marketing responses. The transactions costs associated with the market imperfections, in terms

of acquiring market price information, looking for alternative marketing outlets, etc, would also affect the households' decision of whether, when, where and how much to sell. As the grain markets in China have undergone the substantial reform process, the study of how the market accessibility and viability affect households' marketing decision and how farmers are adopting the strategies in the attempts to reduce transactions costs is important to inform the policy makers of directions for improving the marketing system efficiency through the future policy design and implementation. In this study, some proxies of the household marketing transactions cost collected in the farm survey data set are incorporated in the above marketable surplus function. Further discussion of this issue is seen later in this chapter.

C. Two Estimation Approaches

The above exposition of household wheat marketing response started with a simple model of the wheat production, consumption and marketing decisions. Some of the questions of empirical importance are also discussed when analyzing the marketing responses. Essentially, two approaches can be taken to fulfill this task. One is strictly built upon the structural equations of household wheat supply and demand to derive the marketable surplus response function. The recent agricultural household model literature (e.g. Singh, et al. and Strauss) has applied this approach to determine the marketable surplus elasticities of the exogenous variables. This method can be called the indirect theoretical approach. For practical convenience, a main body of the studies using this approach have adopted the method of estimating separately the

household output supply and demand functions, although the linkage is constructed between the two via the full income budget constraints running recursively from the production decision to the consumption decision.

The structural approach, through its interdependent albeit sequential determination of production and consumption decisions as well as the separability of these functions for estimation purposes, assumes that there is no uncertainty, that all markets exist, and that households may respond to market signals as a continuous process with minimal costs in these markets. In effect, this approach implicitly takes the view that household production, consumption, and the resulting marketing decisions are frictionless.

In the farm household daily decision making, these above assumptions become restrictive. For example, even after wheat output is harvested, the household still has to decide how to manage its wheat stocks, both in terms of when and how much to sell or to buy. In the context of production and consumption decisions, stock management decisions take the harvested output as a fixed asset. Nevertheless, in practice such stock management decisions represent the household marketing responses. Thus, while the traditional direct approach of estimating the reduced form of marketable surplus has its drawbacks, the method of incorporating the factors related to marketing transactions costs helps explore the very issues that are not addressed in the household structural model approach.

7.2 The Structural Model Approach

This section examines empirically the determinants of the sample households' wheat supply and consumption. As discussed in the last section, this examination of output supply and consumption in principle provides some implications about the household marketable surplus responses. Specifically, this analysis helps delineate those important factors of wheat supply and consumption which can be incorporated into the direct reduced form analysis of the marketable surplus function.

A. Determinants of Households' Wheat Output Supply

Wheat production is influenced by farm level variable input use and fixed factors such as farm size, land quality and regional difference that in part accounts for production technology. Other factors also determine the wheat production, including accessibility to output and input markets, input and output price ratio, and off-farm income earning opportunities. All these factors in turn determine the average level of wheat production, jointly through their effects on the wheat sown area and yield level.

Farm size defines the amount of the arable land to be allocated to wheat production. Family laborers determine the labor resources available in managing wheat production. Both of these factors are hypothesized to have a positive effect on wheat output. The number of plots of the farm land reflect the degree of difficulty of production, the more fragmented the land, the more difficult (or more time-consuming) is in tending land and crops and the higher is the likelihood of the harvest losses. Other variables such as the household head's farming experience and education

level reflect expertise in farm production.

Off-farm income during the wheat growing season affects wheat production in several ways. Much of the income is generated through more labor intensive activities such as off-farm employment, cash crop production, livestock and poultry raising. Higher off-farm income would increase the opportunity cost of labor used in wheat production and thus tend to reduce the amount of land and/or labor allocated for wheat production. In addition, the high off-farm income may also enable farmers to purchase wheat instead of producing it at home. On the other hand, in cases of poorly functioning rural capital markets, more off-farm income would enable farmers to increase the use of modern inputs such as commercial fertilizers in substituting for labor input and thus maintain or even increase the wheat production. As a result, the direction of off-farm income effects wheat production is indeterminate.

The relative price ratio of wheat to nitrogen fertilizer is included to account for the production responsiveness to price incentives. A higher price ratio reflects greater profitability of wheat production. The wheat price is taken from the farmers' reported market price at the month of harvest in the previous year. Commercial nitrogen fertilizer is a major cost item in wheat production, accounting for an average 40 percent of total cash expenses. Urea and ammonium bicarbonate are two kinds of factory fertilizers most commonly applied by farmers in the study area. Because the two types have different nitrogen content and farmers used either one or both, the fertilizer price used here is a calculated average purchase price of effective nitrogen by converting farmers' reported average prices of urea and ammonium bicarbonate according to their

nitrogen content.¹ Wheat prices (or nitrogen prices) are calculated, as the village-level weighted prices, with the weights being the shares of farmer's wheat output (or effective nitrogen quantity) to that of the sample farmers in a village.

Wheat yield instability on each farm is calculated by dividing the difference between the highest and the lowest yields by lowest yield in the past five years (when HRS was fully implemented). Yield data were reported by farmers as annual average yield on wheat fields. This variable accounts for the effects that local physical and infrastructural environment, referring to soils, water control, pest infestation, insecure input supplies, and other natural incidence, had on wheat production. A higher yield instability tends to reduce the wheat production because (1) as a fixed factor of wheat production it reflects the localized production damage and (2) it may also reduce farmers' increased use of resources to wheat production if the crop failures are likely.

Finally, a county dummy is included to measure regional difference in other unidentified factors on wheat production. The dummy variable equals one for Huixian and zero for Yuanyang.

Table 7.1 presents the results of the estimated (farm level) wheat output supply function. The variables included together explain two thirds of the total variation of average wheat output among the sample farms. The results show that the most significant factors of wheat production include farm land size, family labor availability, yield instability and the regional factor. One additional unit of farm land increases the wheat

¹ The conversion rate is 47 percent for urea and 17 percent for ammonium bicarbonate.

production by about 180 kgs. One more unit of farm laborers increases the production by about 100 kgs. In addition, the county difference in wheat production was also significant.

Table 7.1
Determinants of Farm Wheat Output Supply

Variables	Unit	Coefficient	T-Statistics
Farm Size	Mu	178.91	8.20
Plots of Land	number	- 51.03	- 1.67
Family Labor	,,	104.22	3.75
HH Head Farm Exp.	year	7.87	1.26
HH Head Schl Year	year	15.03	0.66
Price Ratio (W/F)		1658.87	1.07
Yield Instability	%	- 8.35	- 4.32
Off-farming Income	yuan	0.09	0.69
County Dummy	1 - 0	418.16	4.52
Intercept		245.62	0.44
Adjusted R ² = 0.65 F (9, 140) = 28.52			

Source: Estimated from Farm Survey Data.

The effect of land fragmentation on output is significant. More fragmented farm land leads to farmers' spending more time to move about in tending plots. Yield instability negatively affects wheat output as expected; a one percent increase in the yield instability factor reduces wheat production by 0.2 percent (at the average wheat output in the sample). The relative price of wheat to fertilizer tends to have a

positive effect on wheat production, but the coefficient is insignificant statistically. The effect of variables such as farming experience and education are as expected but insignificant. The off-farm income has a positive but insignificant effect on wheat production. The positive effect of this variable reflects the direct output-enhancing impacts of the off-farm income for the increased use of purchased inputs as more likely offsetting the substitution effect of farm land and labor due to the rising opportunity costs.

B. Determinants of Household Wheat Consumption

Economic theory suggests that consumption is a function of market price vectors and income, in addition to the variables such as household characteristics. Here a quadratic consumption function is specified at the household level. Because of the nature of farm survey data, full budget information for households is not available. Therefore the consumption function is specified in a pragmatic manner. The explanatory variables include household wheat availability, total cash income, the ratio of wheat sales revenue to total cash income, household demographic variables such as size and composition, market prices of wheat, corn and rice, and the county difference.

It is noteworthy that the wheat production included is the net wheat availability after the quota is deducted. It is this amount that farmers can directly control. A relationship between the production capacity and home food consumption may not be strictly linear; the further increase in production capacity may level off consumption after a certain level of consumption (or satiation level). To test this hypothesis, a quadratic

term for the production capacity is included in the model. It is expected that the sign of this coefficient to be negative.

A relative cash income ratio of the wheat sales income to the total cash income is included in the consumption function. In cases where farmers have to sell wheat to meet their cash income requirement regardless of market prices, this income ratio variable reflects this effect of cash income dependence on wheat and is thought to have a negative effect on wheat consumption. A separate variable of the total cash income is included to examine the direct cash income effect on wheat consumption and this effect is expected to be positive. To account for the possibility of non-linear Engel's curve, a quadratic term for the total cash income is also added to the model.

The difference in household composition in addition to the family size may also affect the level of home food consumption. For this effect, a separate variable (the number of adults in a household) is included in the model. This variable is expected to have a positive effect on the level of wheat consumption, since an adult's consumption level is higher than that of an average family member.

In the current static model with production given, the amount of wheat consumed at home will be affected by the market price in that farmers will decide either to sell more and consume less if price increases (vice versa if price decreases). The price variable entering the consumption function preferably is the market purchase price. However, this specific price datum is not available. Instead we use the market sales prices, which is the village-weighted average of farmers' reported sales prices of wheat, corn, and rice. One advantage of using

this price is that it reflects the opportunity cost of wheat being consumed at home and relative to other grains produced. An increase in wheat sales price will raise the opportunity cost of extra unit wheat for home consumption, while an increase in other grain sales price will increase the opportunity costs of these other grains consumed at home.

Table 7.2
Estimated Wheat Consumption Function

Variable	Unit	Coefficient	T-Statistics
Household size,	number	139.20	9.39
Number of Adults,	''	110.21	0.92
Wheat net output,	kg	0.41	5.06
Wheat net output ² ,	kg	- 6.92*10 ⁵	- 4.43
Wheat sales price,	yuan/kg	- 3546.58	- 3.45
Corn sales price,	yuan/kg	4851.88	2.72
Rice sales price,	yuan/kg	801.92	1.06
Relative cash income,	%	- 0.75	- 0.50
Total cash income,	yuan	0.04	2.60
Total cash income ² ,		- 1.03*10 ⁶	- 1.89
County difference,	1-0	123.95	1.60
Incidence of wheat shortage,	1-0	21.84	0.42
Intercept		- 1167.31	- 1.05
Adjusted R ² = 0.72 F(11, 138) = 32.62			

Source: Estimated from Farm Survey Data

Table 7.2 reports the results of the estimated (household level) wheat consumption function. The included variables in the consumption function explain about 72 percent of total variation in household wheat consumption. The signs of effects of the all included variables on wheat consumption level are as expected. Large households consume more wheat simply because of the size effect. On the other hand, the number of adults in a family further increases the level of wheat consumed at home, although the effect is not very significant. While wheat output net of quota contributes positively to the wheat consumption, the magnitude of this effect declines as output increases. This result suggests that the home wheat consumption has a saturation level. The total cash income has a positive but diminishing effect on the wheat consumption. However, households which are more dependent on wheat sales in meeting their cash income needs tend to consume less than do others, although the effect is not statistically significant.

The results suggest that wheat consumption is quite sensitive to the market prices of all three grains. Higher wheat sales price reduces the home consumption, while higher rice and corn prices increase the wheat consumed at home. The price elasticities of wheat consumption with the three sales prices calculated at the sample average are -1.97 for wheat price, 1.89 for corn price, and 0.88 for rice price.

These estimated price elasticities are very high for the grains as the main food staple. One explanation of these results is that the village-weighted average price differences in the sample are very small and the seasonal difference in prices is thus overlooked. The average sales price is for wheat 0.58 yuan per kg with the standard deviation of

0.03 yuan per kg, for corn 0.40 yuan per kg with the standard deviation of 0.01 yuan per kg, and for rice 1.12 yuan per kg with the standard deviation of 0.05 yuan per kg.

An alternative explanation is that as a mirror image, the home consumption response reflects the price response of household wheat marketed surplus. As discretionary grain marketings in China are a residual supply response to prices, the price elasticity of marketed surplus can be very high. The price increase in these markets reflects the higher opportunity costs of not selling wheat. The estimated price elasticity of wheat consumption is consistent with the result of price elasticity of wheat marketed surplus as is shown later in this chapter.

7.3 Direct Reduced Form Analysis of Wheat Market Sales

A. Implications of Household Wheat Marketable Surplus

In theory the estimates of the output supply and consumption functions can be used to calculate the marketable surplus responses from the identity that the marketable surplus equals the production minus the own farm use. However, as pointed out earlier in this chapter, the structural approach has a drawback, in that the derived results make no distinction between the concepts of marketable surplus and the marketed surplus.² The "marketable surplus" indicates the farm households' surplus potential. On the other hand, the concept of "marketed surplus" refers to that realized surplus. This distinction is important in understanding

² See James Moore et al Indian Foodgrain Marketing System, for a discussion of this distinction.

just how variables other than those determining the farm production and household consumption would affect actual marketed sales of foodgrain. In the present case, these other variables include several proxies for market accessibility and other institutional variables such as the quota deliveries and land taxes.

In the following, we concentrate on the analysis of wheat marketed surpluses by incorporating four sets of variables. The sets of variables are chosen on the basis of descriptive analysis results in Chapters Five and Six. Table 7.3 provides a list of specific variables and suggests the hypothesized direction of effects on wheat marketed surplus.

Household Characteristics Category: Five variables are included in this category. (1) The household size influences the level of wheat home consumption. Large household size is expected to have a negative effect on the wheat surplus sales. (2) The dummy variable for a household's previous incidence of insufficient wheat home consumption is also expected to have a negative impact on the wheat sales mainly because of the concern for a sufficient insurance of wheat supply for home consumption. (3) The household cash income from non-grain sources has two effects, one is that a higher level of this cash income would induce the household to consume more wheat at home and thus reduce the wheat sales. On the other hand, the high non-grain income level is also likely to assure that the household can purchase food in the market, so that it may lead to increased wheat sales. Thus, the sign on this variable is indeterminate. (4) The household participation in market sales of other grains (rice and/or corn) is itself an endogenous variable from a whole-farm household viewpoint. Although the problem of simultaneity bias is recognized, this

Table 7.3
Potential Factors Influencing Farmers' Open Market Sales.

Category	Specific Factors, units	Expected signs on wheat market sales
Household Characteristics		
	1.1 Family Size, #	(-)
	1.2 Incidence of Wheat Shortages for home consumption in the past three years, 1-0	(-)
	1.3 Cash income from non-grain sources, Yuan	(?)
	1.4 Sales of Other grain crops, 1-0	(?)
	1.5 Urgent need for wheat sales, 1-0	(+)
Farm Wheat Production		
	2.1 Wheat Production net of the Quota Delivery, Kgs	(+)
	2.2 Wheat Yield Variability, %	(-)
Government Policies		
	3.1 Wheat Quota Procurement, Kgs	(-)
	3.2 Farm Taxes and Local Levies, Yuan	(+)
Market Prices and Physical Access		
	4.1 Village Level Prices, Yuan/kg	(?)
	4.2 Distance to Nearest Rural Periodic Markets, Kms	(-)
	4.3 Distance to County Town Seat, Kms	(-)
	4.4 Road Conditions to Markets, 1-0	(+)
	4.5 Village leaders as grain traders, 1-0	(+)

variable is included in the reduced form estimation of wheat marketed surplus to examine the substitution effect of wheat versus other grain sales. The sign of this effect can not be determined a priori. (5) the household urgent need for cash income is included as a dummy variable, that is it equals to one if a household had built a house or celebrated a wedding (or experiences a death in the family) during the period of the study. This variable is expected to have a positive effect on wheat surplus sales.

Farm Wheat Production Category: Two variables included in this category are the farm wheat output net of the quota targets and the wheat yield variability. (1) Farm net wheat output is expected to have a positive effect on the level of wheat sales; (2) the yield variability measures the extent of year-to-year fluctuations in wheat output on the farm. In analyzing wheat marketed surplus response, we include this variable on the conjecture that knowledge, ex post, about the past crop performance establishes a base-line expectation of crop prospect in the coming year(s). A highly volatile wheat yield, other things being equal, is likely to discourage farmers' market sales in order to maintain adequate surplus for home consumption.

Government Policy Category: As discussed earlier in this chapter, the wheat quota delivery targets will have an income effect on household wheat consumption. A reduction in wheat quotas implies a smaller income loss, thus increasing the household wheat consumption. This variable would be expected to have a negative effect on wheat sales. The variable of agricultural land tax and local levies is expected to have a positive effect on wheat sales. This needs some interpretation in line with our

discussion in Chapter Six. There we noted that although the households selling wheat were not directly paying for the tax and levies, the indirect effect of this variable can be seen because the quota sales income was reduced by deducting the tax and levies.

Market Prices and Physical Access Category: Market prices affect household wheat sales in several ways. Higher prices increase the monetary value of household wheat surplus, this tends to increase its sales. On the other hand, the increased income from sales also has a positive effect household's home consumption. So the net effect of market prices is indeterminate. The farmers' market access are approximated by four variables. Good roads connecting the village to the outside and a shorter travel distance to the rural periodic markets contribute positively to villagers' wheat sales. These directions of the two variables' signs are explainable in light of the discussion in Chapter Five on local assembly market structure and organization in the study area. The results in Chapter Five indicated that although a large proportion of wheat surplus was sold at the village level, the feasibility of moving grain out of the village and the possibility for traders to come to the village would depend on the travel distance and road condition. In particular, the road condition affects whether the traders could get their trucks or tractors into the village. Muddy roads caused by rains may discourage traders. Two other variables are the distance to county seat and a dummy proxy, of if there is a village leader who is also the grain trader. They are included to test two conjectures developed in Chapter Five. In Chapter Five we noted that the distant traders usually first come to the county town seats, so the linkage between the county

seat and village level may affect farmers' wheat sales. Also if there is a leader who is also a grain trader, then he may bring back more updated market information from other areas and also he may have struck a deal with the distant buyers so he can start the local assembly in the village.

B. Wheat Sellers and Non-sellers

One particularly noteworthy issue in this study is that 40 percent of farm households in the sample reported no market sales beyond the completion of wheat quota targets. The sample is thus divided into two sub-groups: those with market sales and those without. Further examination of the data by calculating the households' net sales position³ also reveals that about 20 percent of those households as gross sellers in fact had a negative wheat balance. The data limitation precludes the researchers from knowing if these households actually participated in markets as net buyers or traded their rice (or corn) for wheat consumption. For the present purpose of studying household market sales responses, the net buyers (and or barter trading farmers) need to be excluded from the sample. Thus the resulting sub-sample of 118 households (including 41 of them with zero sales and 77 with positive sales) are used for the following analysis.

Table 7.4 presents the information on the selected household and farm characteristics of sellers as compared to non-sellers. Sellers have a higher wheat output than non-sellers, while non-sellers have more of a

³ This was done by applying an approximate wheat balance equation, that is the total wheat supply of a household (the beginning stocks before harvest plus the current production) equals the total demand (the current consumption plus the ending stocks plus the market trade).

Table 7.4
Selected Household and Farm Characteristics
for Market Sellers and Non-Sellers, 1987/88

Variables	Sellers (n=77)	Non-Sellers (n=41)	T-Values
Quantity Sold to Market, kg	972.92 (838.70)	--	
Household size, #	5.16 (1.86)	5.20 (1.32)	- 0.13
Household head age, years	41.31 (10.01)	40.15 (11.99)	0.56
Total wheat production, kg	2983.60 (1458.40)	2172.50 (989.19)	3.30
Wheat quota targets, kg	544.84 (325.40)	524.55 (302.53)	0.33
Wheat output net of quota, kg	2482.90 (1263.30)	1698.90 (790.45)	3.61
Non-grain cash income, yuan	508.40 (432.56)	588.65 (502.02)	- 0.91
Yield Variations, %	32.94 (29.84)	35.77 (20.81)	- 0.54
Participation in rice (corn) sales (yes = 1)	0.60 (0.49)	0.80 (0.41)	- 2.24
Urgent need for cash income (yes = 1)	0.19 (0.39)	0.10 (0.26)	1.33
Village leader as grain trader (yes = 1)	0.29 (0.45)	0.17 (0.38)	1.45
Distance to nearest rural periodic market, kg	6.27 (6.32)	4.70 (3.62)	1.47
Road Quality (good = 1)	0.65 (0.48)	0.40 (0.49)	2.67
Distance to county seat, kg	22.34 (8.41)	19.13 (5.35)	2.21
Incidence of insufficient wheat supply for consumption (yes=1)	0.10 (0.29)	0.37 (0.49)	- 3.76

Source: Farm Survey Data

wheat quota target relative to their wheat output than sellers. Thus for the sellers, the higher wheat output level will lead to more market sales, the relative quota targets for these households further increases their ability to sell in the markets. In this regard, non-sellers are put in a disadvantageous situation. Non-sellers also have a relatively higher wheat yield variation as compared to the sellers, therefore their concern for adequate household wheat consumption may discourage their sales in the market. Wheat sellers apparently participated less in selling other grain products than wheat non-sellers, thus the cash income need for the wheat sellers may to a larger extent depend on the wheat sales as opposed to the wheat non-sellers. Table 7.4 shows that wheat sellers have a relatively lower non-grain cash income than non-sellers of wheat. The results also indicate that wheat sales are less likely among households with a bad experience in having insufficient wheat supplies for home consumption.

The market access for wheat sellers is relatively better than non-sellers, as reflected by variables such as the quality of roads and whether there is a local official leader as the grain trader in the village. However, two other market access variables including the distance to the nearest rural periodic markets and the distance to county town seats show an opposite situation. In an IFPRI study of household grain marketing responses in Egypt (Alderman and von Braum, 1984), a similar situation occurs. There they explained the seemingly contradictory results in terms of the firm location theory. The closer a farm household locates to markets or to an urban consuming center, the more likely that it will grow cash crops or offer a higher amount of labor for non-grain production. In the present case, this explanation seems

valid as non-sellers have a relatively higher level of cash income and also they have a relatively larger chance of selling corn and rice, the two grains being considered as highly income-elastic products in that corn is used often as feedgrain and rice is consumed as a luxury good.

C. Least Squares Estimates of Sellers' Marketing Responses

One way to employ the reduced form estimation is to discard those households with zero sales (non-sellers) and to concentrate the analysis on sellers. This has been a traditional method of estimating the marketed surplus functions (e.g. Subbarao, 1978, used such "discarding" method). This analysis of the subsample of sellers in the markets helps discern the factors that affect them in terms of how much to sell. Implicit in this analysis is the assumption that the farm sellers will always be active participants in markets. In the following, we first present this "discarding" estimation results. Implications of this approach are then discussed. As a second approach, we later use the "limited" dependent variable" method to analyze both market participation and conditional response effects from the 118 sample households

Table 7.5 presents the Ordinary Least Squares results of the sellers' marketed surplus function. The overall goodness of fit is about 58 percent. The results support the conventional arguments that larger households tend to sell less than do smaller households and farms with a large wheat output would sell more. In this case, the large farms would sell more than 50 percent of an additional unit of wheat output. Households that have experienced previous wheat shortages for home consumption sold less than other households. The estimated coefficient

Table 7.5
OLS estimates of Wheat Market Sales Determinants
(sellers only, 77 households)

Variables (units)	Coefficients	T-Value
Household Size	- 88.36	1.64
Wheat shortage incidence in past three years (yes=1)	- 476.43	1.96
Urgent need for cash income (yes=1)	173.21	0.98
Wheat output net of actual quota delivery, kgs	0.53	6.60
Participation in rice (corn) sales (yes=1)	- 65.00	0.42
Non-grain cash income, yuan	0.17	0.41
Non-grain cash income ² ,	- 0.14*10 ³	0.57
Wheat Quota Target, kgs	- 0.91	2.50
Wheat Price, yuan/kgs	2021.04	0.50
Tax and levies, yuan	11.64	1.83
Yield instability, %	- 1.37	0.18
Yield instability* household size	- 0.26	0.29
Distance to Periodic market, kms	- 24.28	1.14
Distance to County town seats, kms	- 9.46	0.60
Road quality, (good=1)	280.26	1.55
Village leaders as grain trader (yes=1)	141.34	0.87
Intercept	1802.84	0.59
Adjusted R ² = 0.58, F-value (16, 60) = 8.46		

Source: Estimated from Farm Survey Data

of 476 kgs of the wheat shortage variable accounted for slightly less than 50 percent reduction of wheat sales at the group average. This result suggests that the household food security concern may be an important factor for the sellers to decide how much to sell.

Full compliance with wheat quota targets reduces the market sales. But as expected the degree of reduction is not one-to-one. This asymmetric relationship between market sales and quota target delivery is due to the income effect. Smaller quota targets imply a smaller income loss from the inverse price differences between market and quota, and lead to the increased wheat consumption. This results in a smaller amount of surplus wheat to be sold in the market. The estimated coefficient on the wheat quota target variable is 0.91, indicating that the above mentioned income loss effect is likely to be small (only for the sellers). This result is consistent with our findings in Chapter Six. There we saw that the income loss for the all sample farmers was about 9 percent of the wheat sales cash income and less than 2 percent of the household total cash income.

Market prices do not appear to affect the amount of wheat sold by the sellers. The insignificant price effect seems to be inconsistent with the earlier finding from the estimated consumption function (Table 7.2). There the market prices had a significantly negative impact on the amount consumed. Following that reasoning, the price effect would also be expected to be significantly positive on market surplus equation. This inconsistency may be due to the fact that consumption was estimated over the entire sample, while the present marketed surplus equation is estimated only over the sub-sample of the wheat sellers. Therefore, we would expect that when combining the sub-samples of both sellers and non-

sellers, the price effect should be significantly positive on the market participation decisions. In other words, higher market prices may induce more of the previous non-sellers to enter the market. This conjecture will be tested later in this section.

All four proxy variables for market access have the expected signs, but none of them has significant effects in this case. Furthermore, all the remaining variables except agricultural tax and local levies have insignificant effects on wheat sales. One conjecture is that although most of these variables do not significantly affect the quantities sold, they may well influence whether farmers should participate in the market or not. Again this question and other similar ones identified earlier are addressed in the following subsection.

D. "Limited Dependent Variable" Analysis of Wheat Marketing

The above ordinary least squares estimation of farm marketing activities only examined the potential effects of various variables from a seller's point of view. That analysis effectively excluded the effects on household market participation decision. Conjectures were developed in the above discussion regarding the possibility of several variables affecting the farmers' decision whether to participate as new sellers in the market or not. In fact, the farm survey data show that there are quite a number of farmers who did not sell anything beyond the quota delivery. A subsequent question is, how do the changes in the underlying factors have impacts on market participation decision?.

This analysis is important from the standard point of grain marketing reforms. Liberalizing the grain markets implicitly implies greater

participation of grain surplus farmers as sellers. On the other hand, genuine uncertainty and imperfection in the still underdeveloped grain markets, some important farm and household characteristics, and the still unreformed aspects of grain marketing system may likely have significant impacts on farmers' decisions whether to enter into the markets or not. These additional effects can not be discerned from the above least squares analysis of the response function of only currently active sellers.

The limited dependent variable model (or the Tobit analysis in the literature) was first developed by Tobin (1958) to depict demand for automobiles, where for the period of observation there is likely to be some number of nonpurchasers. However, given a longer period, or changes in other conditions, most of these nonpurchasers would purchase the product. The situation in the present case is similar. Sellers and nonsellers are distinguished by a set of specific variables. Nonsellers potentially may become sellers if some conditions, such as a reduction in the quota delivery, were to be changed. The Tobit analysis permits a positive probability of zero sales, unlike least squares procedures that assume an equal probability of observing each point.

The Tobit model is formally expressed as follows: $Y_i^* = X_i\beta + \epsilon_i$, where X_i is a vector of explanatory variables, β is a vector of unknown coefficients, and ϵ_i is an independently distributed error term assumed to be normal with zero mean and constant variances σ^2 . The Y_i^* are the unobserved latent variables. The observed dependent variable is Y_i , where the relationship between Y_i^* and Y_i is

$$\begin{aligned}
 (7.4) \quad Y_i &= Y_i^* && \text{if } Y_i^* > 0 \\
 &= 0 && \text{if } Y_i^* \leq 0 \\
 &&& i = 1 \dots N
 \end{aligned}$$

Specifically for the present case, Y_i is defined as the observed wheat surplus sales through open market channels, X_i is the set of variables as identified above in Table 7.4. For those nonsellers, we only observe that Y is zero. For sellers, Y is the actual sales reported by the households. And N in our case is equal to 118 households.

Given (7.4) and the assumption that ϵ_i follows a normal distribution, the probability of observing a limit observation is $P(Y_i = 0) = \Phi(-X_i\beta/\delta)$, where Φ is the standard normal distribution function. If $I_i=0$ is defined for limit observations and $I_i=1$ otherwise, the associated likelihood function for the observed sample of Y_i 's is,

$$(7.5) \quad L(\beta, \delta | y, x) = \prod (\Phi(-X_i\beta/\delta))^{(1-I_i)} \prod (1/\delta \phi([Y_i - X_i\beta]/\delta))^{I_i}$$

where ϕ is the standard normal density function. The likelihood function can be maximized to obtain estimated of β and δ .

Table 7.6 presents the estimated results of the model.⁴ The results show that household size, wheat consumption shortage history, household net output, wheat quota targets, market prices and two market access variables (road quality and local assembler's presence) all have very significant impacts on farmers' wheat marketing responses. Among other significant variables are the household's urgent need for cash income and

⁴ The software used is Limdep developed by William Greene, 1988.

Table 7.6
Tobit Estimates of Determinants of Wheat Market Sales
(sellers and non-sellers included, 118 cases)

Variables (units)	Coefficients	Absolute T-Value	Sample Means
Household Size	- 116.94	1.98	5.17
Wheat shortage incidence in past three years (yes=1)	- 635.71	3.15	0.19
Urgent need for cash income (yes=1)	167.15	1.52	0.15
Wheat output net of actual quota delivery, kgs	0.57	6.94	2203.88
Participation in rice (corn) sales (yes=1)	- 17.03	0.11	0.67
Non-grain cash income, yuan	0.03	0.07	665.06
Non-grain cash income ² ,	- 0.13*10 ³	0.56	
Wheat Quota Target, kgs	- 1.07	3.03	535.04
Wheat Price, yuan/kgs	5426.63	1.92	0.58
Tax and levies, yuan	9.27	1.60	39.34
Yield instability, %	- 4.07	1.56	34.03
Yield instability* household size	0.49	1.11	
Distance to Periodic market, kms	23.48	1.19	5.58
Distance to County town seats, kms	18.64	1.21	21.23
Road quality, (good=1)	363.32	2.24	0.57
Village leaders as grain trader (yes=1)	355.14	2.54	0.25
Intercept	- 3796.71	1.34	
σ	611.33	12.04	
Log-likelihood value = 624.31			

Source: Estimated from Farm Survey Data

agricultural tax and local levies. Yield instability tends to have a negative impact on household wheat marketing, which is expected as households would like to hold down to their marketed wheat surplus if the possibility of potential crop failure is high. On the other hand, a positive coefficient of the interaction term between the yield instability and household size suggests that large households are more likely to develop some kind of risk-pooling strategy at a given level of yield instability, which to some extent mitigates the negative impact of the yield instability on wheat market sales.

E. Market Entry and Conditional Responses

To examine the marginal effects of explanatory variables on household market entry and conditional response decisions, the Tobit estimates need to be decomposed. As McDonald and Moffitt (1980) show, the expected wheat marketed sales of all sample farms, $E(Y)$ can be represented as the product of the expected wheat sales conditional upon being positive, $E(Y^*)$, and the probability of the sales being positive, $\Phi(X_i\beta/\sigma)$, that is,

$$(7.6) \quad E(Y) = \Phi(X_i\beta/\sigma) * E(Y^*)$$

Following a decomposition procedure developed by McDonald and Moffitt, the marginal effect of $E(Y)$ with respect to a X_i contains the following two components,

$$(7.7) \quad \partial E(Y)/\partial X_i = \Phi(\cdot)(\partial E(Y^*)/\partial X_i) + E(Y^*)(\partial \Phi(\cdot)/\partial X_i),$$

the first term is the change in wheat sales, Y , of those having a positive sales, weighted by the probability of the sales being positive; and the second term is the change in the probability of the sales being positive, weighted by the expected value of the positive sales. Expressed in the elasticity form, the above two effects are,

$$(7.7') \quad \frac{X_i}{E(Y)} \frac{\partial E(Y)}{\partial X_i} = \frac{X_i \cdot \pi(\cdot) \frac{\partial E(Y^*)}{\partial X_i}}{E(Y)} + \frac{X_i \cdot E(Y^*) \frac{\partial \pi(\cdot)}{\partial X_i}}{E(Y)}$$

(1)
(2)
(3)
Total
Conditional
Market
Elasticity
Response Elasticity
Entry Elasticity

The two partial derivatives in the above can then be calculated using Tobit estimates, β 's and δ (Table 7.6). The elasticities are evaluated at the sample average values. Table 7.7 presents the two calculated wheat sales elasticities of market entry and conditional response with respect to changes in a selected number of the independent variables.

Table 7.7
Decomposition of Estimated Elasticities
for Wheat Sold to Open Markets

Variables	Market Entry	Conditional Response	Total
Household size	- 0.374	- 0.408	- 0.782
Yield instability	- 0.037	- 0.040	- 0.077
Ag. Tax/Local Levies	0.264	0.288	0.552
Wheat Quota	- 0.416	- 0.453	- 0.869
Wheat net output	0.911	0.994	1.905
Market Price	2.275	2.480	4.755

Source: Calculated from the Tobit estimates at sample means (Table 7.6).

The estimated elasticities of the selected variables indicate that changes in wheat market prices have the strongest effect on both the farmers' market entry and conditional response decisions. The high price elasticity calculated here is not unusual, considering that after about 25 percent of farmer's wheat output has been taken away by the government as quota, the amount left at the farmer's discretion is limited. In a price/marketed surplus diagram, the farmers' marketed surplus curve is rescaled so that the origin is at the quota target level. As the slope of the marketed surplus curve stays the same with and without the quota (because the latter is fixed and does not respond to prices), the resulting price elasticity calculated at the smaller marketed surplus is high.

The results also show that the effects on market entry participation decisions are slightly less than that of conditional responses. This suggests that, by ignoring the participation effect, the commonly used method in estimating marketed surplus elasticities by deleting households with zero sales (e.g. in Subbarao's study) may have underestimated the potentially greater market surplus response. One implication of this finding, for the case of marketing reforms when the government relaxes market controls and permits farmers to increase their market participation sellers, is that the greater marketing response is possible only when the underlying determinants change in the first place. For example, policies reducing yield instability and improving wheat productivity could enhance the predictability of crop yields and further increase the wheat output, which would lead to a greater marketed surplus.

The above analysis of the Tobit model is conducted on the premise

that both the decision to sell and the quantity sold are based on the one set of estimated Tobit coefficients. It can be seen in (7.5) that the β 's determine not only the probability of observing a positive sales Y_i , but also the expected value of Y_i for positive sales Y_i . An explanatory variable in the Tobit model cannot have differing effects on the two decisions. Nevertheless, such situations are likely to exist. Take the case of market access for example. The decision to sell or not is affected by the farmers' cost of searching whether there is an alternative marketing outlet available. Once they have located a marketing outlet, the search cost incurred may have little or no effect on how much farmers would sell.

A more general model that accommodates these possibilities is (following W. Greene, 1990, p. 736)

(7.8) Entry Equation:

$$\text{Prob}[Y_i^* > 0] = \Phi(r'X_i), \quad z_i = 1 \text{ if } Y_i^* > 0.$$

$$\text{Prob}[Y_i^* \leq 0] = 1 - \Phi(r'X_i), \quad z_i = 0 \text{ if } Y_i^* \leq 0.$$

(6.9) Conditional Response Equation:

$$E[Y_i | z_i = 1] = \beta'X_i + \sigma[\phi(\cdot)/\Phi(\cdot)],$$

This is a combination of the truncated regression model and the univariate probit model. It can be shown that the Tobit model is a special case of the general model for the same set of explanatory variables, iff $r = \beta/\sigma$. For the Tobit log likelihood is the sum of log likelihoods for the truncated regression and probit models, Greene suggests that a likelihood ratio statistics be computed by using this identity.

Table 7.8
Differential Impacts of Market Entry and Conditional Response^a

Variables (units)	Probit	Truncation
Household Size	- 0.28 (1.53)	- 164.43 (1.83)
Wheat shortage incidence in past three years (yes=1)	- 1.11 (2.76)	- 994.62 (2.06)
Urgent need for cash income (yes=1)	0.02 (1.74)	374.18 (0.92)
Wheat output net of actual quota delivery, kgs	0.58*10 ³ (1.92)	0.59 (5.43)
Participation in rice (corn) sales (yes=1)	0.33 (0.76)	- 27.82 (0.14)
Non-grain cash income, yuan	- 0.41*10 ³ (0.40)	0.26 (0.43)
Non-grain cash income ² ,	- 0.51*10 ⁷ (0.09)	- 0.11*10 ³ (0.30)
Wheat Quota Target, kgs	- 0.16*10 ² (1.97)	- 1.67 (2.93)
Wheat Price, yuan/kgs	15.74 (1.89)	1271.50 (0.81)
Tax and levies, yuan	0.01 (0.41)	24.15 (2.59)
Yield instability, %	- 0.03 (1.42)	- 22.90 (1.66)
Yield instability* household size	0.65*10 ² (1.56)	1.67 (1.03)
Distance to Periodic market, kms	0.12 (2.47)	- 54.44 (1.79)
Distance to County town seats, kms	0.08 (1.93)	- 15.03 (0.69)
Road quality, (good=1)	0.85 (2.43)	472.57 (1.79)
Village leaders as grain trader (yes=1)	1.03 (2.43)	108.58 (0.47)
Intercept	- 12.77 (1.67)	1306.26 (0.29)
Log-likelihood value	44.91	565.45
Cases correctly predicted: Sellers	84%	
Nonsellers	78%	

^a Figures in parenthesis are absolute t-values.

Source: Estimated from Farm Survey Data

The following materials discuss the results of such an exercise in the present case. Table 7.8 presents both Probit and Truncated Regression estimates using the same set of explanatory variables as in the Tobit analysis (Table 7.6). The likelihood ratio calculated using the three model results is 27.90 (X^2 [17,0.05] = 27.59), suggesting that the Tobit model is rejected (only at the margin).

Further examination of the results in Table 7.8 leads to the following three observations. First, several explanatory variables have significant effects in the same direction for both the market entry and conditional responses in wheat marketing. They are household size, wheat shortage incidence, wheat net output, wheat quota targets, and road quality. For these variables the Tobit model assuming the one-step decision process appears to be appropriate approach. Large households tend to participate less in market sales and even if as sellers in the markets they would sell less. Larger wheat quota targets reduce the amount of marketable surplus at home, thus effectively screening these households out of the markets and once in the market, these households sell less.

A second observation from Table 7.8 is that several variables have a significant effects either on the market entry or on conditional responses, but not both. For example, a household urgent need for cash income has a significant effect on the decision to enter the markets but not in the decision of how much to sell. Market prices show a similar situation, the effect on market entry is significant but not so much on the conditional response. On the other hand, agricultural taxes and local levies have little effect on market entry but a very significant positive

effect on how much to sell. A dummy variable accounting for the market access (whether there is a village leader as grain trader) shows that the presence of grain traders has a strong positive effect on whether farmers are going to enter the market or not. In Chapter Five, we pointed out that the village level assembly was predominant in the study area, local assemblers and traders acted as an effective bridge between the farm level marketing and long distance trader. The presence of local grain traders serves as an effective marketing outlet for the villagers, while the village leaders are often on business in county towns where the grain assembly deal between him and distant buyers could be struck. These mentioned effects strengthen the farmers' ability to get access to market. On the other hand, once farmers have got access to such markets, the effect of this very factor on how much to sell is not significant.

Finally, the two models estimated show an intriguing result for two market access variables, the distances to the county town seats and to rural periodic markets. Distances to market and urban center have significant and positive effect on market entry but a negative effect on the quantities sold once in the market. Earlier a similar finding of IFPRI study in Egypt was cited using the firm location theory to explain that remote farms are more likely to grow foodgrains because they have less incentives to grow cash crops, which have fairly high transport costs. The variables for wheat production may not completely account for such specialization. If farmers in remote areas were generally poorer, this would also have shifted their food demand and thus have left a

greater surplus to be marketed.⁵ On the other hand, the negative effect on the conditional responses is expected.

7.4 Chapter Summary and Implications

This chapter developed an analytical model of farmers' wheat production, consumption and marketing responses. The unique feature of this model is that it accounts for the dual characteristics of the farm household as wheat producer and consumer. The basic model is generalized to incorporate factors such as government quota policy and proxy measures of market transaction costs in understanding how they may influence farmers' responses in wheat marketings. A key premise of this analysis is that while the marketing reforms encourage a greater participation of farmers as grain sellers, the inherent uncertainty and risks in the still underdeveloped markets may have significant impacts on farmers' decisions whether to enter into the markets and how much they are able and willing to sell. This chapter is a natural extension of the descriptive analyses of market and farm level impacts presented in the previous two chapters. Findings from the earlier descriptive analyses are incorporated in this chapter to assist the construction of econometric models and the interpretation of the estimated results.

The econometric analysis of farmers' marketing responses involves alternative methods of estimating the farmers' marketable as well as marketed wheat surplus response functions. The farmers' wheat supply and

⁵ This explanation is cited here as a pending hypothesis, which was not tested for the sample farmers in the present study.

consumption functions are first estimated. While in theory the estimated functions could be used to derive farmers' marketable surplus responses, this study argues that a more sensible approach in understanding the farmers' marketing responses is to examine how various factors might have affected farmers' actual marketing positions (or the realized marketed surplus). This approach provides more substantive information on how the government policy variables and market transaction costs might have entered into farmers' marketing decisions.

The direct estimation of farmers' marketed surplus response functions employs both the least squares method and the limited dependent variables method. The former analysis examines the marketing responses of those households who are assumed to be active and continuous sellers in the market. The latter analysis, the limited dependent variables approach, relaxes that assumption and estimated the farmers' market entry and conditional responses.

The yield instability also tends to discourage farmers' wheat market sales. This is because the farmers' ex post knowledge about the past crop performance establishes a base-line expectation of crop prospect in the coming year(s). A highly volatile wheat yield, other things being equal, is likely to discourage farmers' market sales as they attempt to maintain an adequate reserve stock for home consumption. This result suggests that while increasing average wheat output per household can lead to an increased marketable surplus, stabilizing wheat yield is also important. Our descriptive analysis in Chapter Six points out that some of the potential causes of yield instability (as reported by sample farmers) are related to the management of irrigation systems and water supply, the

fertilizer supply situation and appropriate application, as well as the weather conditions. That information helps delineate possible ways of reducing the wheat yield instability, specifically by strengthening the rural farming infrastructure.

The previous incidence of wheat shortage for home consumption also has a significant negative effect on wheat market sales, mainly because of the household food security concern. This suggests that improving the household food security situation is crucial to strengthen farmer's marketing responses. Several policy measures would include increasing the farm wheat productivity and further strengthening alternative household cash income earnings, among others.

The estimated results indicate that market access variables such as road condition, distance to travel and the traders' linkage between village and distant market levels also have significant effects on farmers' decisions to enter the market as sellers and the decisions of how much to sell. Importance policy measures such as the development of market infrastructure and institutions to strengthen farmers' access to markets (and to traders) would have beneficial effects in terms of the increased marketed surplus.

The estimated positive effect of land taxes and local levies on farmers' wheat sales reveals farmers' cash flow problems. Policies designed to increase a steady and stable flow of household cash incomes would be more constructive. For example, the current tax and levy collection procedure in the study area was such that more than half of the tax money was collected during the wheat harvest season.

The econometric analysis also indicates that the above discussed

effects are important both for farmers' market entry and conditional response decisions. Indeed the estimated elasticities of market entry and conditional responses share the same magnitudes. This result suggests that ignoring the market entry decision may well under-estimate the total market responses (at least for the sample households in this study). Equally important, the high total elasticities indicate that changes in the underlying exogenous variables such as the yield instability have an important effect on wheat market sales.

The empirical analysis further suggests that farmers' wheat marketing responses also need to be differentiated in terms of market entry and conditional responses. For example, the trader's linkage between the village assembly point and distant market has a significant positive effect on farmers' decision (or ability) whether to enter the market or not. On the other hand, this variable has no significant effect on farmers' decision of how much to sell. This result suggests that improving traders' access to the village level, improving the information flow about the wheat surplus situation and price discovery process across the villages and between village and distant markets could contribute to a greater market involvement of local surplus wheat producing farmers.

CHAPTER VIII

SUMMARY, POLICY IMPLICATIONS, AND FURTHER RESEARCH

8.1 The Research Perspective: A Recap

This study was carried out in the context of the rural economic reforms in China that began in 1979. The main reform components included (1) reorganizing agricultural production by dismantling the communal system and developing the new individualized arrangement, called the Household Responsibility System, and (2) restructuring the farm input and output markets by modifying the state controlled monopoly system and adopting more market-oriented approaches. In essence, the reforms aimed to decentralize coordination mechanisms and to revise incentive structures within which rural economic activities are mobilized.

Reform is a process of institutional transition. It is a process because the reform measures are not made all at once; they are introduced sequentially. Knowledge of the transitional process is vital to learn more about the properties of alternative reform measures and to respond to the accumulating knowledge by making further changes in the economic mechanisms.

The purpose of this dissertation was to provide a descriptive and diagnostic analysis of the experience with grain marketing reforms. The study had a primary focus on local assembly market and farm household

impacts of the marketing reforms in a grain surplus area. The evolving pattern at the nation level of grain marketing system reforms and price policy changes was first reviewed as a background for this study. The rationale and progress of the transition from a centrally planned system to a more market-oriented arrangement was described. The existence and functioning of local grain assembly markets with respect to the changing roles played by public and private-sectors were investigated. The specific research interest was to identify the opportunities and constraints confronting different market participants as the marketing reforms progressed. The effects of the market-oriented reforms on farm households' wheat production and marketing responses were then examined.

Conceptually, this research takes the view that the marketing system involves not only the physical distribution of agricultural products, but also the mechanisms and processes to coordinate production, distribution and consumption. The coordination takes place through market transactions among participants in a system defined as a set of interrelationships. Aggregate consequences of the behavior of the participants in a system are defined as the system performance. To effectively facilitate the coordination process the marketing system needs to be decentralized, flexible and progressive in order to accommodate the dynamic nature of the marketing system, the ubiquitous existence of risk and uncertainty related to agricultural activity, and the variations in geographic patterns of production and consumption.

Two analytical approaches have been adopted to examine market and farm household level impacts of the grain marketing reforms. First, the structure, conduct and performance paradigm was used to assess the extent

that local grain assembly markets existed and were actually functioning in the wake of the market reforms. Secondly, a farm household model was developed to examine theoretically and empirically the important factors affecting farmers' grain production and marketing decisions.

The field research for this dissertation was conducted in Xinxiang municipality in Henan province in central China. The regional diversity in China prevents generalization of the findings of this geographically focused study, but the importance of the empirical findings should not be minimized. The field research site is traditionally one of the major grain-surplus producing areas in the country. Thus, grain production and marketing in this area is important in the overall balancing of supply and demand at the national level. The field research was an integral part of the overall study of marketing policy experiments in Xinxiang, sponsored by the Research Center for Rural Development of the China State Council. Finally, this research, with the emphasis on the market and farm level impacts of the reforms, can contribute to a better understanding of local marketing activities and to the design and wider adoption of the experimental market reform policies for other areas in China.

8.2 Summary of the Major Findings

A. Market Reform Progress in the Grain Subsector

The fundamental motives underlying the grain marketing reforms in the 1980's were to reduce the increasingly burdensome price subsidies incurred by the state and to increase the system's flexibility and responsiveness

so as to improve the effectiveness of market coordination. Major reform measures included (1) scaling down the state monopolized operations, (2) reducing the amount of surplus grain procured under the quota program, (3) implementing a new contract purchase program, and (4) encouraging greater participation of the private sector in grain market transactions. In the transitional period, a dual-track marketing system has been emerging where planned contract purchases by the public sector and market trading by both public and private-sector participants coexist.

A critical review in Chapter Two of the progress of grain marketing reforms at the national level leads to the following observations. First, the reform measures were only partially successful in achieving the desired effects. The mounting subsidy costs were temporarily brought to a halt as a result of a reduction in grain purchases by the state at over-quota prices and an increase in sales at market prices. Yet the budget burden was reduced for only two years in 1985 and 1986. By 1987 and 1988 the subsidy expenditure began to increase again. A main reason for the increase in subsidy costs was because the grain marketing reforms had not extended fully to the consumer sector; the rationed grain distribution still accounted for about 80 percent of the total grain retailed in the late 1980's. Second, the contract purchase program was not implemented as effectively as desired, partly because the contract purchase prices soon became unattractive as compared to market prices, so that farmers had little incentive to enter into a contract with the state, and partly because the contracts were not voluntary as they were interlocked with the farmers' land taxes and other local taxes. Finally, the nation wide concern over the unanticipated reduction in grain output in 1985 and the

production stagnation since then, also brought forth some doubts about the future of the market-oriented reforms.

Despite the emerging problems and difficulties, the grain marketing reforms were well underway by 1988. By then, there had been increasing evidence of changes in the food system, in terms of (1) the dynamics of urban consumers' grain purchase and consumption behavior as their income levels increased and (2) the increased involvement of private traders in the marketing system. Moreover, the policy debates had come to a general conclusion that the reforms toward a more market-oriented approach were necessary in order to improve system efficiency and to achieve a sustained development of the agricultural and rural sectors.

Encouraging evidence of further progress of grain marketing reforms was that a number of provincial and local governments showed increasing interests in marketing and price reforms in their grain subsectors. Some had adopted various measures to further modify state involvement in grain trade by adjusting producer and consumer prices and/or changing the way that the ration distribution system operated. These regional reform measures and tactics often differed one from another, reflecting local and provincial differences in resource endowment and the pace of local reform initiatives. For example, the Xinxiang municipal government reduced the total grain surplus procured under the quota program -- the quota grain procurement was 23 percent of the production in 1985 and it was reduced to 13 percent by 1987. This reduction was achieved primarily by excluding rice and corn from the quota program. At the time the field research was conducted in 1988, wheat was only crop subject to quota procurement. Factors underlying this particular rearrangement were many.

Perhaps the most important one is that wheat is the main food staple for local residents. Consequently meeting the local demand for a sufficient and stable supply would avoid the political discontent of local consumer groups. In addition, the reform measure of excluding rice and corn from the quota procurement also reflected the government's attempt to mitigate the budgetary pressure because it was unable to buy the target quantity of rice and corn without substantial increases in the quota prices. The Xinxiang government also attempted to raise the state wheat quota purchase prices up to market level, to reduce the input subsidies, and to reassess land productivity as a basis for modifying the land taxation scheme.

B. The Existence and Functioning of Local Grain Assembly Markets

B-1 Market Structure

Changes in the configurations of grain supply and derived demand at farm gate as a result of the marketing reform were the basic precondition within which local assembly markets began to emerge and develop. Since rice and corn were excluded from the quota procurement, farm marketable surpluses of these crops constituted the market supply in the study area. In 1987 the rice marketed surplus was estimated to be about 60 percent of the production and the corn marketed surplus 53 percent. The marketed surplus of wheat was estimated to be about 55 percent of the production in 1987, of which 47 percent was under the quota procurement, and the remaining 53 percent was sold through the local "free market" assembly channels. The marketed surpluses were in turn absorbed by many types of end-users, including rural households, local non-farm consumption, private

food catering services and restaurants, and distant buyers from outside of Xinxiang. The latter's demand for the local grain was conservatively estimated to be about 21 percent of surplus grains moving outside of the Xinxiang municipality during the period from 1985 to 1988. Thus, it is safe to say that the role of local assembly markets in grain transactions outside of the quota deliveries has extended from merely balancing the localized supply and demand to greater involvement in interregional trade.

The local grain assembly markets observed in the study area were developing several marketing channels involving both public and private traders. The state marketing agencies were engaged not only in quota grain procurement (wheat in this case) but also in market transactions of non-quota grains (rice, corn and above-quota wheat). This latter function was organized by newly established companies within the existing grain departments. Their purchases were made directly by agents located at township grain buying stations. Rural periodic markets had been farmers' traditional market outlet for surplus grain beyond quota. The village level assembly performed by private traders formed yet another marketing outlet. Opening of these alternative marketing channels was benefiting producers to the extent that they now have several marketing options to choose from, thus strengthening their bargaining power with grain traders.

Multiple marketing channels notwithstanding, the dispersed village level assembly and direct marketings between farmers and distant traders were prevalent. The sample farmers reported that in 1987/88, they sold 67 percent of their surplus (non-quota) wheat, 53 percent of their corn and 96 percent of their rice to local private traders and/or to distant buyers operating through commission agents at the village level. Several

factors contributed to this pattern of dispersed village level grain assembly. First, the lack of their own means of transportation made it difficult for many farmers to move surplus grain to the rural periodic markets or to engage in long distance trade. On the other hand, the well-connected rural road network made it possible for distant buyers to come directly to the village level to secure the amount of grain desired. Second in the case of rice, the small private rice mills at the village level not only provided the milling services for farmers but also served as grain assemblers for distant buyers, thus helping the marketing coordination between villagers and distant buyers. Finally, village level assembly and trade were also seen by private traders and farmers as a means to avoid the government's market closure decree which was often issued during the post-harvest season when the quota procurement was taking place.

B-2 Market Conduct and Trader's Behavior

How have different marketing participants responded in terms of their market entry and exit, forms of price and non-price competition, trading relationships with producers, assemblers for distant buyers, and strategies in coping with the uncertainties of supply and demand, credit, information and regulations? These elements of traders' behavior underscore important aspects of coordination mechanisms at and beyond the local grain assembly markets. The following summary focuses on two major findings, namely, the behavioral changes of the state marketing hierarchy and the opportunities and constraints of the private sector's involvement in grain trade.

Behavioral Changes of the State Marketing Hierarchy In the wake of grain marketing reforms, the state marketing hierarchy began to show increased responsiveness and flexibility in adapting itself to the new marketing and policy environment. For example, the state-owned grain enterprises and local grain buying stations in the study area opted for shortening the marketing chain by purchasing grain closer to the farm level and arranging sales directly with distant buyers. Competition was seen not only between the state marketing agents and private traders but also among state grain enterprises engaged in grain transactions outside of their prescribed administrative hierarchy and geographic areas.

Several external forces contributed to changes in market conduct by the state marketing agencies. Increased competition pushed assembly marketings closer to the farm gate. Due to their organizational inflexibility and location disadvantage, the state grain buying stations had lost the market share they previously enjoyed under the monopolized system. The sample farmers reported that in 1987/88 they sold 17 percent of their wheat, 13 percent of their corn and only 3 percent of their rice to the state grain buying stations. When distant buyers come to the area to purchase grains they often by-passed the state marketing hierarchy and established trading agreements directly with local buying stations and/or grain processing and storage enterprises. In response, local buying stations began to dispatch their employees to villages to collect surplus grains from farmers.

The change in market conduct on the part of the state marketing agencies also resulted from a number of changes in the incentives and sanctions facing the state marketing hierarchy. Reduction in quota grain

procurement quantity meant that the state grain enterprises were motivated to locate additional grain to fully utilize the fixed capacity in storage and processing facilities. Schemes for allocating the working capital used by the state grain channel were also changed so that a higher-level marketing unit was no longer responsible for allocating the capital used for "negotiated grain purchases and sales". Consequently the local buying stations and state grain enterprises had to manage on their own in securing loans from the banks. In addition, the state marketing sector (in the study area at least) had adopted a new approach related to internal transactions. The approach was for the subordinate marketing agencies and enterprises to remit to a higher-level unit a certain amount of their profits from grain buying and selling. In the course of this new internal relationship, the previous requirement for grain to be moved through the hierarchy became less and less a binding constraint for the local grain buying stations.

Initiatives and Constraints of the Private Sector's Involvement The study found there were many private traders of different types engaged in grain trading, including village assembly agents, inter-village assemblers and processors, inter-village petty traders, rural town-based assemblers and wholesalers, and distant traders. With the aforementioned increasing market share gained and the marketing services provided to local grain producers and distant buyers, these various private assemblers and traders have contributed to the coordination of supply and demand in the grain subsector. Nevertheless, the private traders' incentives and strategies were developed or perhaps underdeveloped in an environment of limited opportunities and many financial and institutional constraints. Aspects

of the institutional and financial constraints are summarized below.

While only a limited number of the larger private traders were engaged in searching for the potential buyers and sellers, many others were passively relying on the incoming distant buyers for purchase orders and funds. Trading relationships among assemblers and wholesalers and distant buyers were established on the basis of commission. Formal contracts were virtually absent for reasons including the lack of trust among strangers and the difficulty of accurately specifying and later honoring the terms of the contract. Where informal contracts (the most common form being oral contracts) did exist, there were also incidents of failure to honor these contracts. One of the major reasons for default of the informal contracts was that distant buyers placed multiple contracts with local assemblers at different locations. The total quantity of grain contracted would be greater than what they actually wanted to buy. For a distant buyer to do so would provide some kind of safety net; if one placement was not met, he could get the grain from another placement. This behavior by distant buyers affected local private assemblers' position, with the absence of or ineffectiveness of the commercial law to protect the legal status of a contract.

Major institutional constraints on private grain trade resulted from the slow change in rationed distribution of food grains in general and the regional differences in the pace of the marketing reforms in particular. The local governments closed grain markets in order to purchase sufficient grains to meet the rationed grain distribution requirements. Even in the case of rice and corn which were excluded from the quota program in Xinxiang, private trade was prohibited and disrupted during the immediate

rice and corn post harvest season in 1988. Local governments in areas where rice (or corn) remained under quota complained that if Xinxiang were allowing the private trading of rice (or corn), it might have induced the leakage of the grains from other locations to Xinxiang, thus endangering the proper fulfillment of the grain quota within these other areas.

The market regulatory functions were complicated by the fact that there were overlapping and often conflicting administrative responsibilities among several government agencies, which in turn compounded the difficulty in establishing an effective and supportive set of market regulations. These aspects of control and lack of it increased the uncertainty and risk perceived by private traders about their legitimacy in open market trade. The market information system and standard grades and measures had not been systemically established. While several public agencies engaged in collecting market price data, no concerted and regular attempt was made to disseminate the spatial and temporal price information to producers and private traders. Traditional information exchange by word of mouth was predominant among farmers and private traders. Visual inspections served to check grain quality. This created marketing inefficiencies and led to unbalanced bargaining power and frequent disputes on trade agreements among grain buyers and sellers as pointed out above.

B-3 Market Performance

Although the grain marketing reforms stimulated entry by private grain traders, to speak of an active and progressive private grain trade sector would be an overstatement. On the one hand, the state marketing

system, particularly the mandate of quota procurement and distribution, still dominated and strongly influenced the overall grain marketing system. On the other hand, the operational capacity of most private assemblers and local traders remained small and they faced numerous constraints to expand their businesses, including the uncertainties in supply and demand, the absence of a market price information system, limited access to credit, and perhaps more importantly, the lack of stable expectations about government policies towards the private sector.

The outcome of this dual-track grain marketing system was mixed. The private sector's entry into grain marketing and trading increased market competition between the state and private market participants. Indeed the private grain assemblers and wholesalers managed to gain an increasing share of the grain marketed surplus. Nevertheless, due to their small scale, and reluctance and inability to expand their operational capacity, private traders were also seen to follow very short-term transaction strategies with a rapid turnover of the grains they purchased from farmers. Seasonal operations and sudden entry/exit typified their grain purchases and at times left the markets inactive.

The analysis of market price integration and seasonal price behavior in the grain subsector further indicates some major problems of spatial and temporal coordination in the grain marketing system. High price correlation coefficients of two grain crops (wheat and rice) between pairs of the fifteen sample villages suggest that price formation at the local level may be influenced by a similar set of factors of supply and demand and by the increased competition through private traders' spatial price arbitrage in the study area. However, price correlation over the broader

geographic areas, say at county or provincial level, was generally weak. Factors adversely affecting regional pricing coordination included the underdeveloped transportation network and the institutional constraints such as interregional restrictions on grain movement.

The issue of the temporal market coordination remains partially unanswered. Specifically, questions such as where the grains entering the markets were stored were not resolved. The farm survey data shows that a high percentage of farmers' grain surpluses (particularly for rice and corn in this case) were marketed in the first two or three months of the marketing year. The local private assemblers and wholesalers, due to lack of storage facilities and the credit constraint, appeared to have not engaged in grain storage. This would single out the state marketing enterprises and other distant buyers from outside of Xinxiang to hold the grains in storage. Thus the future studies on issues of how these enterprises and distant buyers have made their grain storage and release decisions become critical to further understanding the performance of temporal market coordination.

Turning to the farm level study of grain storage, the results from a gross margins analysis suggests that at the existing seasonal price pattern, farm household wheat storage could not be profitable for any duration over three or four months. Yet, the farm survey data shows that the percentage of households storing wheat was relatively high both after the post harvest time and before the next harvest season. It is conceivable that farm level wheat storage was viewed by households as a food security strategy in protecting them from unexpected production shortfalls in the coming crop year. This practice of wheat stored by

individual households could result in significant physical losses. Promoting a collective (or group) storage activity would likely reduce these losses and increase farmers' bargaining power. However, the poor performance of the existing village-level storage (the group "food bank") may discourage individual farmers from participating in collective storage arrangements.

C. Farm Households' Responses to Market Reforms

To understand the farmers' economic behavior it is necessary to seek positive knowledge of (1) the extent to which farmers were in a position to respond to economic incentives and (2) how they responded. A formal questionnaire survey was conducted with a sample of 150 farm households in Xinxiang, who were mainly engaged in grain production. The farm level study focused on wheat production and marketing activities. This choice was made because wheat is the most important item of household grain consumption; it accounted for three-quarters of the grain consumed at home. Wheat production occupies 80 percent of the cultivated land in the winter and spring season. Very few other crops could be grown during this season. By 1988 wheat was the only crop subject to the state quota delivery program in the study area.

The resource endowment and non-grain income earnings differed greatly among households. Though the egalitarian land distribution rule applied, land size varied widely -- even on a per capita basis. Households also differed in terms of the percent shares of different income sources, but grain sales accounted for about two-thirds of an average household's cash

income. The average quantity of all surplus grains sold by the sample households in 1987/88 crop year was about twice the national average. This finding suggests that the sample farmers are fairly commercialized in their grain production and that grain sales are a very important income source, implying that improvement in the grain production and marketing system would have a positive impact on a household's incentive to respond.

Further increase in farm wheat sales would have to rely primarily on increases in yields since nearly all of the farm land during the winter and spring season has been devoted to wheat production. The survey data show that there was significant variability in wheat yields over the past several years for a given household and among different households in a given year. Farmers indicated that annual yield variations were due mainly to lack of an adequate irrigation system or flood control, unstable availability of fertilizers, and insufficient technical extension support.

Although the overall grain quota target was reduced, the wheat quotas during the past several years in fact increased for the average household in the study area. Due to the unfavorable quota purchase price relative to market prices, larger quota requirements reduced household cash income generated from wheat sales. The survey results suggest that the wheat quota program tended to be regressive in that small farmers delivered a larger percent of their crop than large farmers and the lower yield farms also tended to have a larger share of quota delivery from their wheat production. This unequal and regressive distribution of quota delivery targets led to the unintended consequences of uneven income distribution among the sample households.

Recognizing the farmers' income "loss" involved in quota delivery,

the government had adopted complementary incentive policies to subsidize input supply and to make advance payments to farmers. This study found that neither of these incentive programs was effectively implemented. The unstable availability of subsidized fertilizer deserves special attention. Concurrently with the grain marketing reforms, the fertilizer distribution system was also organized with multiple channels. While farms delivering wheat quotas were entitled to some amounts of the subsidized fertilizers the corruption among fertilizer distributors had diverted the subsidized fertilizer to higher priced sales opportunities. About 70 percent of the sample households reported that the prices they paid for urea and ammonia bicarbonate were substantially higher than the subsidized prices. Many farmers were unable to obtain any of the subsidized fertilizers.

The study found that slightly more than half of the farmers' participated in open market sales of wheat. The remaining households were probably unable to make open market sales due to low production, high wheat quota delivery targets, large requirements for subsistence consumption and/or high market transaction costs. The results show that the amount of wheat available at home varies significantly among different households; the small households had post-quota wheat supplies that barely covered their own consumption, while the large farms had much larger wheat supplies which enabled them to participate in open market sales. Thus the benefits of open market trade accrue to those who are in position to sell beyond and above the delivery quota.

Econometric analysis of wheat marketing responses applied several methods of estimating the farmers' marketable as well as marketed surplus responses. They included the structural approach of estimating farmers'

grain supply and consumption functions to infer their marketable surpluses responses, the least squares method of estimating sellers' marketed surplus responses, and the limited dependent variables method to estimate farmers' market participation and conditional responses.

The most sensible results are those from the limited dependent variable approach. The farm and household characteristics are found to have some important impacts on farmers' wheat market sales. Large farmers tend to sell much more than do the small farmers, and households with large families tend to sell less than do households with small families. Higher yield instability tends to discourage farmers' participation in the market as well as the amount sold even if they have entered the market as sellers. This is probably because the farmers' ex post knowledge about the past crop performance establishes a base-line expectation of crop prospects in the coming year(s). A highly volatile wheat yield, other things being equal, is likely to discourage farmers' market sales mainly because they put a high priority on maintaining an adequate supply for home consumption. The results also show that the previous incidence of wheat shortages for home consumption had a significant negative effect on wheat market sales, mainly because of the household food security concern.

Market access as approximated by variables such as road conditions and traders' linkages between village and distant markets have significant effects on farmers' ability to enter market as sellers and their decisions of how much to sell. This suggests that the marketing reforms could not be fully effective by simply reducing the quota procurement quantity and increasing the purchasing prices. Complementary policy measures such as development of market infrastructure and institutions to strengthen the

farmers' access to markets (and to traders) would also increase the marketed surplus.

The econometric results further indicate the above identified effects are important both for farmers' market entry and conditional response decisions. The estimated entry and conditional response elasticities of wheat marketed surplus with respect to wheat output, output variability, market prices and market access variables are very close to each other in their magnitudes. This suggests that ignoring the market entry decision may underestimate the total marketing responses (at least for the sample households in this study). The fact that total elasticities were high indicate that changes in the underlying factors like those affecting yield stability have a significantly large effect on wheat market sales.

8.3 Policy Implications

A. Introduction

The study findings summarized in the previous section have important implications for policy changes directed towards the creation of a more dynamically efficient and flexible grain marketing system at and beyond the local assembly level. Before proceeding to elaborate a proposed set of policy and institutional changes suggested by this study, it is critical to first establish a broader policy and system-wide perspective within which these changes are to be carried out. The present study was conducted with a primary focus on the impacts of grain marketing reforms on rural assembly markets and grain producers; the proposed policy and

institutional changes based upon the findings at this level have some major ramifications and also hinge on the reform progress at other levels of the grain marketing system. For example, the further growth of an open market channel for grain will be affected by decisions concerning the future use of state-owned infrastructure which includes a network of grain storage, processing and transportation facilities. This raises critical issues regarding continued adherence to public ownership of basic resources and guaranteed employment that are at the center of the socialist economic principles. Furthermore, the grain rationed distribution and quota procurement has been a cornerstone of the state marketing system and the concern for food security. Thus, the advancement of market-oriented grain marketing system reforms can not successfully proceed without careful consideration of these broader policy issues, but this is beyond the scope of this study.

Assuming that the broader policy issues can and will be addressed, there are several specific grain market reforms that are suggested by this study. They include: reassessment of markets as a major coordination mechanism and the role of the private sector as an important player in the market; modification of the manner and extent of the public sector's involvement in grain marketing; major institutional innovations towards developing a network of wholesale markets and related market regulatory functions; increasing farmers' market participation by encouraging farm level production, improving marketing infrastructure and strengthening local producers' group action.

In essence, these policy changes and institutional restructuring are to reduce the existing institutional and physical constraints and to

increase opportunities for different marketing participants to actively take part in the grain marketing system. They should be viewed as an interrelated set in that further legitimizing and expanding the role of private trade sector necessitates modifications of the state grain marketing system and the development of supportive market regulatory institutions such as the legal protection of contracts and adoption of standards and grades. Likewise, improving the performance of grain assembly markets calls for institutional innovations such as establishment of a network of wholesale markets and further development of a market information system.

B. Increasing the Private Sector Participation

First and the most critical, government policies need to clearly recognize the positive role of private traders and to legitimize their marketing activities; it is simply not sufficient for the government to be lenient to private trade. Private traders not only face the uncertainty about supply and demand but also lack stable expectations of government policies. A stable institutional environment could reduce traders' perceived insecurity and risks in grain trading and strengthen their continuous participation.

Supportive market regulations include the legal protection of grain trading contracts and adoption of standard measures and a classification and grading system. These institutional changes are crucial to reduce the transactions costs incurred in the frequent default of contracts and the associated disputes and inefficient trading practices such as visual

inspections. As discussed later, the development of a network of wholesale markets could contribute to increase the price transparency across a set of local assembly markets, facilitate the price discovery process, and reduce the possibility of opportunistic behavior resulting from impacted market information on the part of market participants.

To broaden private sector's access to trading activities requires reducing the barriers to entry. Markets work efficiently only when enough traders compete with each other to keep marketing margins equal to actual marketing costs, with no room for excess profits, but with rewards for superior performance in the short term. Typical entry barriers observed in the study area include the following: (1) the local governments restrict distant buyers to the purchase and transport of grains outside of the area; and (2) the private traders have no access to the centrally controlled rail transport system. The lack of access to commercial credits also constrained many private traders from expanding their participation in the grain trade. The field study indicated that the existing state commercial banks had no credit lines for financing private grain traders. Increased access to credit by grain traders is necessary in order to expand the private sector's role and to create a more competitive grain marketing system. It should be pointed out that this would require a more general reform of the existing financial system.

The field research reveals that grain stocks information is still considered by the government as "secret", not to be revealed to the public. In order for the private sector to effectively expand its market participation, market information including data on stocks and forecasts of production should be made available to private traders. The quality of

market supply, demand and price data collected in the study area needs significant improvement. Improving the data collection system requires a concerted effort among the market regulatory agencies and a systematic and consistent reporting of market prices, estimated marketed surplus moved by different channels and grain crop prospects. For example, market price data collection can be improved by selecting a set of markets and reporting the prices on a regular basis. The information analysis (especially price analysis) includes the temporal and spatial price changes, the price margins, and the forecasts of possible changes in future market prices. This set of information helps facilitate marketing participants' decisions regarding grain storage, inter-regional trade and the public sector's price stabilization programs.

C. Modifying the Public Sector's Participation

To argue for an expanding role of private sector's involvement in the grain marketing system should not be interpreted as ignoring or doing away with the public sector's participation all together. Instead the public sector can be modified to play a more important role in some aspects of the new marketing system. Policy makers need to review the viability of the state grain system in three dimensions: financial, functional and institutional (Timmer, 1987). Financial viability depends on mechanisms by which the price stabilization role of the public sector is financed and the transparency with which those mechanisms can be seen and understood by outside parties. Functional viability of the public sector depends on the relevance and importance of the tasks it is asked to perform. Two

existing tasks assigned to the public sector have been to procure the quota grains and to participate in market trade. As this study has shown, conflicts and contradictions often occurred with respect to the working capital allocation within the state grain marketing department. Funds were only available for quota grain procurement but not for market trade. Higher level grain departments required the subordinate agents to remit the profits from market trade in order to finance budgetary losses of the quota procurement and ration distribution. The public sector often exercised the mandate of the quota procurement task to preempt or prohibit grain trading in markets. The public marketing hierarchy has experienced organizational break-downs -- lower level agents often bypassed the state marketing channel and traded directly with distant buyers. Subsequently there is need to identify the institutional, legal, regulatory and other measures to further diminish the public sector's dominant position in grain marketing, while strengthening its role towards that of an orderly marketing force in the system, such as maintaining strategic stockpiles, price stabilization, and seasonal procurement and disposal in regions that experience extreme gluts or shortages. A related aspect of institutional viability of the public sector is to help develop a more viable competitive private market sector, for example by renting storage and other facilities from the grain department and/or subcontracting the infrastructure operations.¹

¹ One evidence of this action is that in the study area (Yuanyang county) the county grain department's "negotiated grain buying and selling" company was preparing to lease their facilities and enter into a management contract with the successful bidder.

D. Institutional Innovation and Development

Network of Wholesale Markets The study shows that while local assembly markets have emerged in the study area, there is virtually no evidence that wholesale markets exist. A high proportion of surplus grains were sold through dispersed village level assembly and shipped directly to the distant buyers outside of the area. This dispersed pattern of grain assembly and trade has led to costly and inefficient mechanisms of market price discovery and is prone to misconduct by the trading parties.

Wholesale markets are of importance in coordinating farm supply and retail demand. They are important points where supply and demand are balanced and where the process of price formation takes place. Efficiency of the pricing process influences to a great extent the incentives provided to farmers and the stability of agricultural markets. Furthermore, wholesale markets are important centers of communication where information is exchanged among the participants, and where innovations essential to the development of the production and marketing system are initiated. A network of wholesale markets should link supply and demand with broad regional and national coverage. This is done by establishing not only the county level transfer markets but also large-scale regional terminal markets and central trading places in major producing and consuming areas. Marketing support system becomes critical to facilitate wholesale trade. Several key elements of the support system include the clear specification and general acceptance of the grain quality standards and grades, the legal protection of trading contracts,

and the designation of a special central trading commission to supervise wholesale trading.

Recent information from China (China Daily, Feb. 2, 1990) suggests that while the policy makers realize the desirability of establishing wholesale grain markets, only public sector enterprises are allowed to trade. The present study shows that by 1988 private traders had become increasingly involved in local grain assembly and inter-regional trade as well. Encouraging private traders' participation in wholesale market trade would be beneficial in terms of broader information flows and greater price transparency, which would further improve the efficiency of the overall grain marketing system.

Market Regulatory Institutions In the study area, there are three government agencies all claiming market regulation responsibilities. They are the Grain Department, the Market Administration Office, and the Price Bureau. The confusion of who was responsible for specific regulatory actions often caused conflicts among public agencies. The Xinxiang municipal government has recently developed a constructive proposal to establish a new market regulation committee including various public agencies. This committee would be charged to provide general policy coordination and would have the authority for developing overall guidelines for market management. However, the proposal stops short of inviting private market traders to participate in the committee. Private traders have their own concerns and responsibilities to be involved in this committee. Failing to have their representatives in the committee could reduce the information flow from private traders to the market management activity.

E. Increasing Farmers' Participation in Grain Marketing

To increase farmers' participation in grain markets requires a policy design process to take into account two sets of issues: Producers' grain productivity improvement and increased access to product and input markets. First, the study findings indicate that increased wheat output at the farm level would come primarily from increased yields because nearly all the available land has already been devoted to wheat production. Yield increases call for the increased use of variable inputs and improvements in production technology and farm management. Fertilizer supply and distribution has an important bearing on yield increases. Subsidized fertilizer distribution tied to grain quota delivery has been shown not to be effective mainly because the fertilizers were either not available or priced too high by the corrupted public fertilizer distributors. Farming system infrastructure such as irrigation and water supply management, as shown in this study, has a great impact on grain yields. A critical issue is to design an institutional replacement for the previous communal arrangements that could provide the necessary services for improving and maintaining the rural production and technical assistance infrastructure. Possible alternatives include voluntary producer group actions, village community sponsorship, and/or direct state investments.

Increases in grain yield needs to be combined with the technological innovations for stabilizing grain yields. The study showed that the grain yield variability had a negative impact on the amount of grain surplus farmers are willing to sell, due to the households' perceived food

insecurity arising from the uncertain and varying crop prospects. Again improving the rural farming infrastructure such as irrigation systems, the input distribution systems, and yield-stabilizing production technological innovations could help stabilize the crop yields, and hence minimize the production risk.

Second, increasing farmers' access to markets offers another way to strengthen farmers' market participation. The study showed that a strong linkage between the village assembly and distant markets, such as better roads and existence of local traders actively searching for the potential distant buyers, had a significant positive effect on farmers' ability to sell their surplus grain. To reduce the transactions costs involved in searching for potential buyers and further increase farmers' bargaining power, timely gathering and dissemination of market price information could help farmers to determine the time and location of sales.

Group marketing activities could strengthen farmers' bargaining power with private traders, obtain the benefits of scale economies from large volume marketings, and facilitate the flow of price and local grain supply and demand information. As the study has indicated, a number of factors had led to poor performance of the existing group storage and marketing activity. In Huixian, for example, more than a half of the group storage establishments had gone bankrupt in the past three years. The important factors indicated in this study include the following. First, the absence of a supervisory board composed of producer representatives leaves the storage and marketing managers to behave opportunistically at the expense of producers. Second, there was a lack of legal protection and enforcement of marketing contracts, leading to the long delay and/or default of

payments by distant buyers. And finally, the existing group storage and marketing establishments provided no additional services other than storage and local assembly. The farm survey results suggest that a majority of farmers in the study area were interested in voluntary group action that could provide timely market information and other marketing functions such as better grain cleaning and transport services.

A significant institutional restructuring and development is needed to help promote the voluntary marketing cooperatives. Specific measures include: (1) a cadre of marketing technicians through a university based extension programs to promote and organize the cooperatives and train the managers; (2) business supervision through the elected boards of directors and regulations to guard against opportunistic behavior by managers and boards of directors; (3) development of additional marketing services, such as the provision of market information, product cleaning and initial processing and transport functions, to increase individual farmers' incentive for participating in the group action. In the study area, each village now has one or two small private rice mills and/or wheat flour workshops. Also, in some villages there are a few individuals engaged in private transport businesses. These existing services could be organized through a cooperative effort to provide a better coordination of grain marketing functions.

8.4 Implications for Further Research

This study has focused primarily on local assembly market and farm household impacts of the grain marketing reforms in rural China during the

period from 1985 to 1988. The empirical research findings were pertinent to the geographically limited location and based upon the information from the first-hand data gathering (such as the farm survey and the direct interviews with various marketing participants) and the secondary data from several local government agencies.

In retrospect it needs to be pointed out that the field research methodology, including a rapid reconnaissance study, a well designed and implemented questionnaire survey, direct interviews with various marketing participants, was useful in generating the "data base" pertinent to the study objectives. This type of field research approach can be improved and is recommended for future research describing and diagnosing marketing issues. The rapid reconnaissance method is particularly useful in obtaining realistic, broad-based knowledge that is needed to identify actual and potential problems in a new field research environment.

A limitation of the market level research in this study was the lack of precision regarding private traders' activities. This is attributable to factors such as the newly emerging nature of private sector involvement in grain trading and the reluctance of traders to provide complete and accurate information on their activities in fear of the government sanctions. Moreover, the lack of a traders' population census calls into question the representativeness of the interview information. Such a census was not available when this study was conducted, mainly because there had not been a complete record in the study area of who were the private traders involved in the grain trade. The official profile of the licensed traders was incomplete, as the study later found out that there were many traders who had not obtained a license despite the fact that

they had actively engaged in the grain trade. Most of the traders were located at the village level and their activities were seasonally dispersed. Future studies of a similar type would benefit from a systematic survey of a representative sample of traders. This, of course, requires a general population census of various private traders involved in grain market trade in order to construct a sampling frame, from which a representative sample could be selected.

Another limitation of the market level study was that it was not able to thoroughly explore the impacts of distant market demand and supply on local assembly activities. For example, how well do the market prices integrate over a broader geographical coverage? How does distant market demand and supply affect seasonal price movement in a local market? Such a study would be very beneficial in further understanding how the marketed grains are moved across different markets and what are the opportunities and constraints that influence the local grain marketing activity. Furthermore, a thorough comparative analysis of the private versus public sector's marketing activities in terms of the financial and economic marketing costs of grain assembly, transportation, processing, and storage, would provide a more solid base for understanding the effectiveness of different marketing channels.

The farm-level study was conducted through a one-shot survey of farmers' production and marketing activities. One limitation of this study is that it failed to obtain the information on households' grain purchase or other non-market transactions. This lack of information on market purchase and non-market transactions constrained the understanding of the impacts of market reforms on those farmers who may happen to be

grain-deficit. Whether market reforms by opening up the alternative marketing channels benefit or hurt these deficit farmers could not be discerned from this study. The study analyzed farm household production and marketing behavior by econometrically determining the relative importance of various factors. The alternative estimation approaches to farmers' marketing behavior are recommended for future similar studies in order to provide a cross-reference check for validity of a particular approach. In this study little attempt was made to use these estimates in simulating the impacts of exogenous changes on farm production and marketing behavior and the resulting consequences. This type of analysis would be beneficial in further exploring the impacts of alternative policy measures.

It is suggested that future studies of grain market reforms concentrate on the following areas. First, more in-depth studies of private and public traders' behavior are needed. Formal questionnaire surveys of a sample of traders is necessary to generate more precise results. Furthermore, the studies need to be extended to regional and national market system coordination, for example, how well the proposed wholesale market development might contribute to improved market coordination. Second, farm survey and household-level studies need to extend to the whole farm household model approach to examine formally the interactions of grain activities with other economic activities. Finally, changes in urban and rural consumption patterns deserve serious research. No such study has been done, yet the indirect evidence suggests that there have been some fundamental changes in the consumers' grain demand structure. A demand systems approach of incorporating multiple markets

and the rationing system into demand models could be used to analyze the consumers' economic behavior. This type of research will prove to be critical, as the urban basic grain ration system reforms depend upon a detailed knowledge of grain demand patterns among different income and regional consumer groups.

APPENDIX
FARM SURVEY QUESTIONNAIRE

FARM SURVEY QUESTIONNAIRE¹

IDENTIFICATION: _____: _____: _____: _____
COUNTY TOWNSHIP VILLAGE HOUSEHOLD

Respondent Name _____

Enumerator Name _____

Date _____

I. Family Background

1. Age of household head _____
2. Years of education (including evening schools) _____
3. Farm experience (years) _____
4. Size of the family (number) _____
of which:
 - Males between age 14 and 65 _____
 - Females between age 14 and 60 _____
5. Number of family members working permanently outside _____
6. Total family laborers living at home _____
7. Any member of your family working as local government's
cadres? (Yes = 1, No = 0) _____

¹ This is an English Translation of the Original Questionnaire in Chinese.

1. How many mus of farm land does your family have?
(As of that Assigned by the village) _____
2. How many mus of farm land are you currently operating? _____
of which:
-- How many mus that you rented in from others? _____
-- How many mus that your recently reclaimed from waste land .. _____
3. How many mus of your farm land are rented out? _____
4. Into how many pieces is your farm land divided? _____
5. Of your currently operated farm land, how many mus are in
dry land? _____

III. Crops' Sown Areas and Yields

1. Please fill in the table the crop sown areas and yields during 1985 - 1988. Sown areas (SA) in mus and yields (Yld) in kgs

[illegible]

2. After the Household Responsibility System was introduced in 1982,

What was your highest yield for (kg per mu)

Wheat
 Corn
 Rice

What was your lowest yield for (kg per mu)

Wheat
 Corn
 Rice

3. What was the most important reason causing the yield instability?
 (please fill in the code number)

WHEAT
 1) Seed Quality 2) Weather 3) Disease and Pest
 4) Fertilizer Supply 5) Irrigation
 6) Others (please describe)

RICE
 1) Seed Quality 2) Weather 3) Disease and Pest
 4) Fertilizer Supply 5) Irrigation
 6) Others (please describe)

CORN
 1) Seed Quality 2) Weather 3) Disease and Pest
 4) Fertilizer Supply 5) Irrigation
 6) Others (please describe)

4. Please fill in the highest and lowest prices paid for fertilizers
 purchased (yuan per kg) and the amount of fertilizers used per mu
 for each of three crops, wheat, corn and rice in 1987/88 crop year.

Types of Fertilizer	Highest Price	Lowest Price	Wheat	Corn	Rice
Urea					
Ammonium Bicarbonate					
Compound Fertilizer					
Phosphate					
Potash					

IV. State Grain Contract Purchase

1. How did the village leaders contract with you? _____
 - 1) according to family size
 - 2) according to the labor available on the household
 - 3) according to the amount of land assigned
 - 4) others (please state) _____
2. When was you informed of the assignment of the contract? _____
 - 1) before the wheat planting
 - 2) early in the spring
 - 3) before the wheat harvesting
3. What was the amount of fertilizers (in book value) provided to you in 1987/88 when you signed the grain delivery contract with the village?
 - 1) Urea _____
 - 2) Other 1 (please specify _____) _____
 - 3) Other 2 (please specify _____) _____
4. How much of the above guaranteed fertilizer supply did you actually obtain in 1987/88?
 - 1) Urea _____
 - 2) Other 1 (please specify _____) _____
 - 3) Other 2 (please specify _____) _____
5. Please fill in the following table the quantity in kilograms of grains contracted by your family as well as the amount you actually delivered. (The amount contracted needs to be checked with the village account records)

Crop Year	Wheat		Rice		Corn	
	Contract	Delivered	Contract	Delivered	Contract	Delivered
1987/88						
1986/87						
1985/86						
1984/85						

6. Have your family experienced any incidence of under-fulfilling the wheat contract during the past 2-3 years? _____

1) YES 2) NO

IF "YES", PLEASE DO NUMBER 7

7. Please state the reasons for which you under-fulfilled the wheat contract
- 1) Production shortfall due to natural disasters;
 - 2) The contracted amount was too high;
 - 3) Local taxes tied to the contract delivery were so high that it left little cash to the pocket;
 - 4) Free market wheat prices were higher so that I sold some of the contracted amount to the market;
 - 5) Other (please state) _____
8. Were any family in the village who under-fulfilled wheat contracts?
- 1) YES
 - 2) NO
9. What are the village level regulations regarding households that fail to fulfill the state purchase contract?
- 1) Cash payment for the difference between market and contract prices;
 - 2) Later delivery of other grains products;
 - 3) Partial exemption;
 - 4) Other (please state) _____
10. Please specify the land tax and other local taxes you were required to pay in 1987/88 (in yuan).
- 1) Land Tax Total _____
of which
the amount you paid at wheat harvest _____
 - 2) Other Local Taxes Total _____
of which
the amount you paid at wheat harvest _____

V. Surplus Grain Marketed to Free Markets

1. Please fill in the following table the amount of wheat, rice, and corn that you sold other than the state contract delivery during the 1987/88 crop marketing year. The table is designed such that you need to record when, how much, and at what prices you sold. Three alternative sales places refer to (A) periodic markets, (B) village assembly, and (C) local buying stations (at market prices). Also please state what use of the sales revenue, for which please refer to the checklist below.

A Checklist of the Sale Revenue Use

- | | |
|-----------------------------|----------------------------------|
| 1. Purchase Farm Production | 6. Bank Deposits |
| 2. Purchase Farm Machinery | 7. Ceremonies |
| 3. Daily Expenditure | 8. Repay Loans
and Borrowings |
| 4. House Construction | 9. Local Taxes |
| 5. Water Service Charges. | 10. Others |

WHEAT SALES INFORMATION

Year - Month	1987	July	Aug	Sept	Oct	Nov	Dec	1988	Jan	Feb	March	April	May	June
How Much (kg)														
Price (Y/kg)														
Where (A-B-C)														
Money Use														

CORN SALES INFORMATION

Year - Month	1987	July	Aug	Sept	Oct	Nov	Dec	1988	Jan	Feb	March	April	May	June
How Much (kg)														
Price (Y/kg)														
Where (A-B-C)														
Money Use														

RICE SALES INFORMATION

Year - Month	1987	7	Oct	Nov	Dec	1988	Jan	Feb	March	April	May	June	July	Aug	Sept
How Much (kg)															
Price (Y/kg)															
Where (A-B-C)															
Money Use															

2. What benefits do you see selling to state grain buying stations? ____
(Multiple choice is allowed)

- 1) Collect grains year around so that I can sell any time;
- 2) Close to my home so that it is locationally convenient;
- 3) I trust the way the state is doing business;
- 4) Other (please state) _____

3. What benefists do you see of selling to the village assemblers? ____
(Multiple choice is allowed)

- 1) Location convenience;
- 2) The assemblers have greater quality allowance than the buying stations;
- 3) My village has a wheat (or rice) mill that can provide me with the milling service;
- 4) Other (please state) _____

4. What benefits do see of selling to the periodic markets? ____
(Multiple choice is allowed)

- 1) "Equal Exchange";
- 2) I can know the prices at which grains are exchanged;
- 3) I like to buy household articles after the sales;
- 4) Other (please state) _____

5. How far is your home from a nearest periodic market? (km) ... ____

6. What is the road condition to the market? ____

- 1) Tar-paved; 2) Smashed rock-paved; 3) Dirt Road

7. Do you go to other longer-distance markets to sell grains? .. ____

- 1) YES 2) NO

8. What has been your most difficult problem when wanting to sell surplus grains? ____

- 1) Difficult to know what is the most favorable price;
- 2) No one wants it when I want to sell some grain;
- 3) Lack of transportation facility;
- 4) Other (please state) _____

9. Do you see a need for an organized group marketing activity? ____

- 1) YES 2) NO

IF "NO", PLEASE GO TO NO. 13

10. What benefits do you expect from this kind of group action? _____
(Multiple choice is allowed)

- 1) Time-saving and less cost than the individual sales;
- 2) United as a group in dealing with traders;
- 3) Provision of market information;
- 4) Provision of other processing and storage activity;
- 5) Other (please state) _____

11. What is the most important factor you see for initiating such a group action? _____

- 1) A strong sense of community among participants;
- 2) A strong leadership by the group managers;
- 3) A clear specification of quality control for pooling the grains together from different farmers;
- 4) Sufficient working capital;
- 5) Other (please state) _____

12. What types of governmental assistance do you see for initiating and regulating group action? _____

- 1) None;
- 2) Training and extension programs;
- 3) Provision of commercial credit;
- 4) General guidelines for the producers' group action;
- 5) Other (please state) _____

13. If wheat output increases, would you like to sell more or to choose not to? _____

- 1) YES
- 2) NO

14. If wheat market price is falling, do you want to sell immediately more of the surplus grain in storage or to choose not to? .. _____

- 1) YES
- 2) NO

15. If wheat market price is rising, do you want to sell immediately more surplus wheat in stock or to hold it and wait? _____

- 1) YES
- 2) NO

VI. On-Farm Grain Storage and Family Grain Use

1. Where do you usually store most of your grains? _____
 1) Village group storage place 2) At home
2. Is the village storage place managed by a private manager? _____
 1) YES 2) NO
3. How do you store your grains at home? _____
 1) In bulk form 2) In bag
4. What is the annual loss for grains stored at home? (for example, how much is lost per 100 kgs stored due to rodent and/or moisture)
- 1) Wheat _____
 2) Corn _____
 3) Rice (Paddy) _____
5. Please fill in the following the grains you stored at home (in kgs) at three points of the past marketing year?
- 1) Wheat June, 1987 _____
 Feb., 1988 _____
 June, 1988 _____
- 2) Corn June, 1987 _____
 Feb., 1988 _____
 June, 1988 _____
- 3) Rice Paddy Sept, 1987 _____
 Feb., 1988 _____
 June, 1988 _____
6. Please fill in the following table the amount of grains that your family had consumed in a year during the past three years. (in kg)

Year	Wheat	Corn	Rice	Other Coarse Grain
1987/88				
1986/87				
1985/86				

7. During the past several years, has your family experienced any incidence of insufficient wheat supply for home consumption? ... _____

1) YES

2) NO

If "No", Do next section

8. In the case of insufficient wheat supply, did you just replace with corn or other coarse grains? _____

1) YES

2) NO

9. Did you borrow some wheat from other villagers or relatives? _____

1) YES

2) NO

10. Did you have to buy some at the markets? _____

1) YES

2) NO

VI. Household Cash Income Sources

Please complete the following questions by entering the amount of cash revenue you earned from various farming and non-farming activities in the 1987/88 crop year (in Yuan).

1. Cash Crops Sales Revenue _____
of which:

Cotton _____ Oilseeds _____ Fruits and Melons _____
Lily Flower _____ Others _____

2. Sideline Cash Earnings _____
of which:

Selling Pigs and Sheeps _____
Selling Poultry and Eggs _____
Others _____

3. Off-farm Employment Return Cash Returns _____

4. Remittances from relatives and family members working outside _____

5. Other Sources _____
(please specify)

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