Wheat Marketing and its Efficiency in India

Vasant P. Gandhi
Abraham Koshy

W.P. No.2006-09-03
September 2006

INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD-380 015
INDIA

Wheat Marketing and its Efficiency in India

Vasant P. Gandhi
Abraham Koshy
Indian Institute of Management, Ahmedabad, India[1]

Abstract

The study examines the marketing of wheat in India, focusing on the private marketing system, the marketing efficiency and quality. Wheat is now a major food staple in India, crucial to India's food economy and security. With production reaching 70 to 75 million tons and a large demand, India's wheat economy is the second largest in the world. The efficiency of marketing is crucial to farmer incomes, consumer welfare, as well as government budgets and the economy. Substantial changes are taking place in the marketing of wheat. The study finds that the farmers now almost invariably sell in the nearby primary markets rather than to village traders. The farmer choice of varieties is now becoming market oriented with quality and market acceptance becoming as important as yield. The typically market intermediary provides hardly any special, value adding or developmental services in return for the commissions and margins. The farmers see considerable scope for improvement in the marketing system. The consumer demand for wheat varies considerably across the country. But wheat has made inroads into food consumption in the east and the south. The retailers are increasingly conscious of consumer demand and quality, and keep a varietiy of wheat and wheat products. Direct buying of wheat grain, storing, and own recourse to processing are common in the north and the west, whereas direct purchase of wheat products such as flour is the norm in the east and the south. The trend is towards direct purchase of processed wheat products, and within this from loose to packaged branded wheat products.

The estimated average total marketing cost of wheat is found to be of the order of Rs. 266 per quintal, and in this transport has the largest share of 40 percent, commission and taxes make up 25 percent, and wastage another 15 percent. When compared to the consumer-farmer price spread, the marketing costs account for 74 percent of the spread, leaving 26 percent for margins – this is fairly efficient but there is significant scope for improvement. On an average, the farmers receive 66 percent of what the consumer pays. The government channel marketing cost is reported to be Rs. 309 per quintal, but this does not cover the whole chain and is not strictly comparable. Examination of the question of market integration for wheat is difficult due to data and quality difference problems. Co-integration analysis using monthly price data for eight markets for the period April 1997 to June 2004 indicates that nationally the markets are integrated but the LOP (Law of One Price) does not hold, and the presence of six common stochastic trends implies the absence of full pair-wise co-integration.

---

[1] Based on paper presented at the IAAE 2006 Symposia: Wheat Marketing Efficiency: Country Comparisons, Wheat Quality Issues and Future Trends, at the Conference of the International Association of Agricultural Economist (IAAE), Gold Coast, Australia, August 12-18, 2006. The author wishes to gratefully acknowledge the contribution of Maurice Landes, Bryan Lohmar and Ashutosh Roy to this research. Contact: gandhi@iimahd.ernet.in

Introduction

Wheat is a major food staple in India, and is crucial to India's food economy and security. With wheat production of 70 to 75 million tons annually and a large demand, India's wheat economy is now the second largest in the world. The marketed surplus from the production has also been rising and it is estimated that about 60-70 percent of the production now comes to the market (India, Directorate of Economic and Statistics 2002). As a result, the marketing system and its efficiency is of serious concern and interest in India. Poor efficiency in marketing has serious consequences for both producers and consumers as well as for the government budgets and the economy. Serious questions have been raised about the working of the market mechanisms and market related policies for wheat and rice. The study examines the marketing of wheat in India, focusing on the marketing efficiency and quality issues.

Various studies have examined India's food grain and wheat economy: these include Sidhu and Byerlee (1991, 1992), Sims (1988), and Gandhi (1997), Sarma and Gandhi (1990), Bhalla, Hazell and Kerr (1999), Gandhi and Koshy (1997), and Gandhi, Zhou and Mullen (2004). In the 70's and 80's, some studies had examined the grain marketing and its efficiency in India (e.g. Lele 1971, Subbarao 1978, Kainth 1982). However, no recent studies are available which take a comprehensive look at wheat marketing and its efficiency through field based research.

Background of Wheat in India

Wheat has made the largest contribution to the growth of foodgrain production in India. This is shown by the growth rates: wheat production has grown at a much faster pace compared to other foodgrains (see Table 1). During 1950/51-2000/01, when total foodgrain production grew at an annual rate of 2.68 per cent, wheat production grew at 5.36 per cent. Even in the last decade, wheat production is showing the fastest growth, though a slow down is evident.

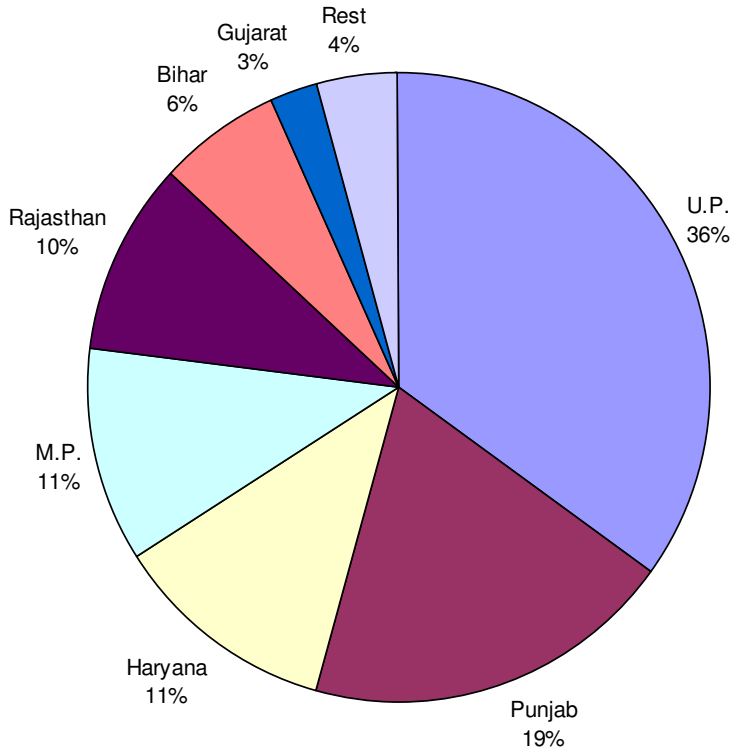
The growth in wheat production has come from increase in yield as well as expansion of area, see Table 2. The increase in area sown has come at the expense of coarse cereals and pulses area, and from an increase in cropping intensity through multiple cropping.

Table 1 : Growth and Composition of Foodgrain Production in India (mill. tons)					
Years	Rice	Wheat	Coarse Cereals	Pulses	Foodgrains Total
1950/51	20.6	6.5	15.4	8.4	50.8
1970/71	42.2	23.8	30.4	11.8	108.4
1980/81	53.6	36.8	29.0	10.6	129.6
1990/91	74.3	55.1	32.7	14.3	176.4
1999/00	89.7	76.4	30.3	13.4	209.8
2000/01	85.0	69.7	31.1	11.1	196.8
2001/02	93.3	72.8	33.4	13.4	212.9
2002/03	71.8	65.8	26.1	11.1	174.8
2003/04	88.3	72.1	38.1	14.9	213.5
Annual growth rate (%)					
1950/51-2000/01	2.77	5.36	1.04	0.56	2.68
1991/92-2003/04	1.09	1.99	-1.22	0.11	1.21
Sources: Based on India, Directorate of Economics and Statistics, Ministry of Agriculture.					

Table 2: Wheat Production in India			
Year	Area (m ha)	Production (m t)	Yield (kg/ha)
1950/51	9.8	6.5	663
1960/61	12.9	11.0	851
1970/71	18.2	23.8	1307
1980/81	22.3	36.3	1603
1990/91	24.2	55.1	2281
1999/00	27.5	76.4	2778
2000/01	25.7	69.7	2708
2001/02	26.3	72.8	2762
2002/03	25.2	65.8	2610
2003/04	26.6	72.1	2713
Annual Growth Rates			
1950/51-2000/01	2.10	5.36	3.19
1967/68-2003/04	1.31	4.08	2.74
1981/82-2003/04	0.75	2.95	2.18
1991/92-2003/04	0.72	1.99	1.26
Sources: Based on India, Directorate of Economics and Statistics, Ministry of Agriculture.			

Nationally about 18 per cent of the net cropped area is planted to wheat. Figure 1 shows the shares of different states in the national wheat production. Uttar Pradesh (U.P.) contributes the largest share with 36 per cent of production, followed by Punjab with 19 per cent and Haryana with 11 per cent. These three northern states together contribute two-thirds of the production of wheat. These are followed by Madhya Pradesh (M.P.) 11 per cent, Rajasthan 10 per cent, Bihar 6 per cent and Gujarat 3 per cent. All the rest contribute only 4 per cent. As expected, the major wheat growing states are all in the north.

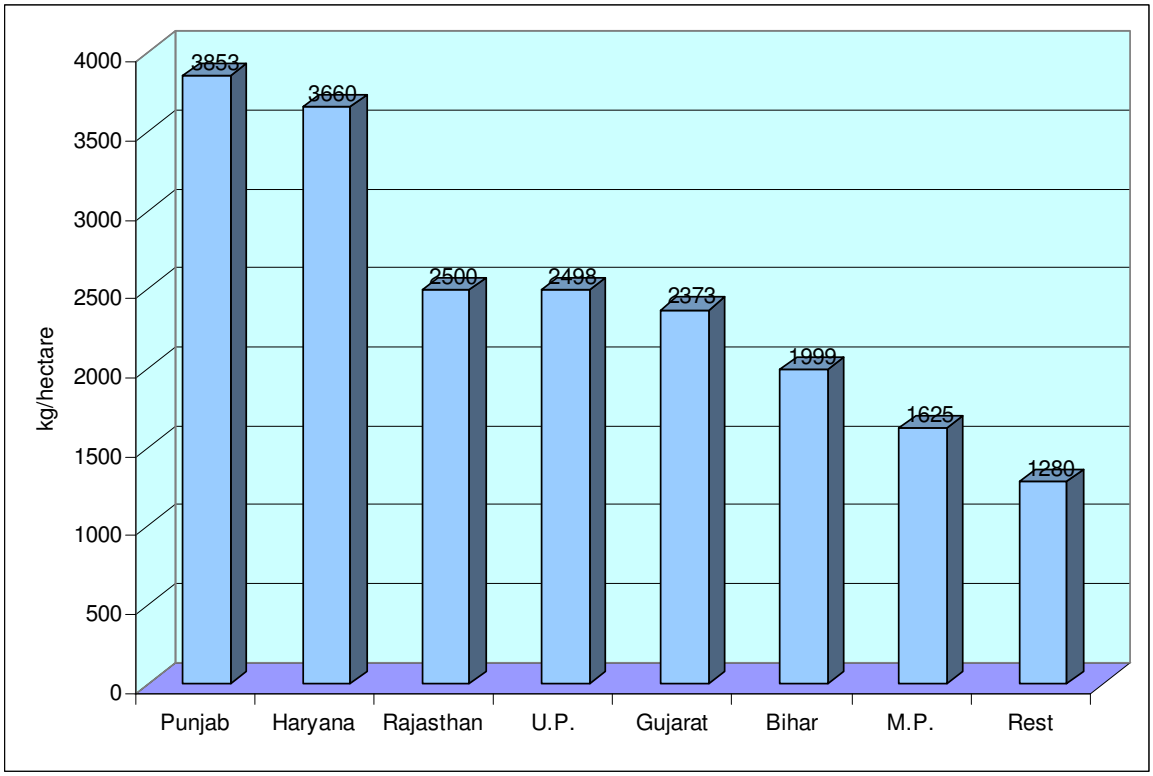
Figure 1: Distribution of Wheat Production across States



(1997-98) Source: Based on data from India, Directorate of Economics and Statistics

Another feature of wheat production is that the wheat yields vary substantially across the states, as shown by Figure 2. Punjab and Haryana show the highest yields of 3853 and 3660 kg/ha, respectively. These are followed, after a significant gap, by Rajasthan, U.P. and Gujarat with 2500, 2498 and 2373 kg/ha respectively – which are close to the national average of 2583 kg/ha. Bihar and M.P. follow with much lower yields of 1999 and 1625 kg/ha, respectively. These yields can be compared with 2907 kg/ha in USA, 1907 kg/ha in Australia, 1029 kg/ha in Russia, 3667 kg/ha in China and 7603 kg/ha in France (FAO 1998).

Figure 2: Wheat Yields across States



(1997-98) Source: Based on data from India, Directorate of Economics and Statistics

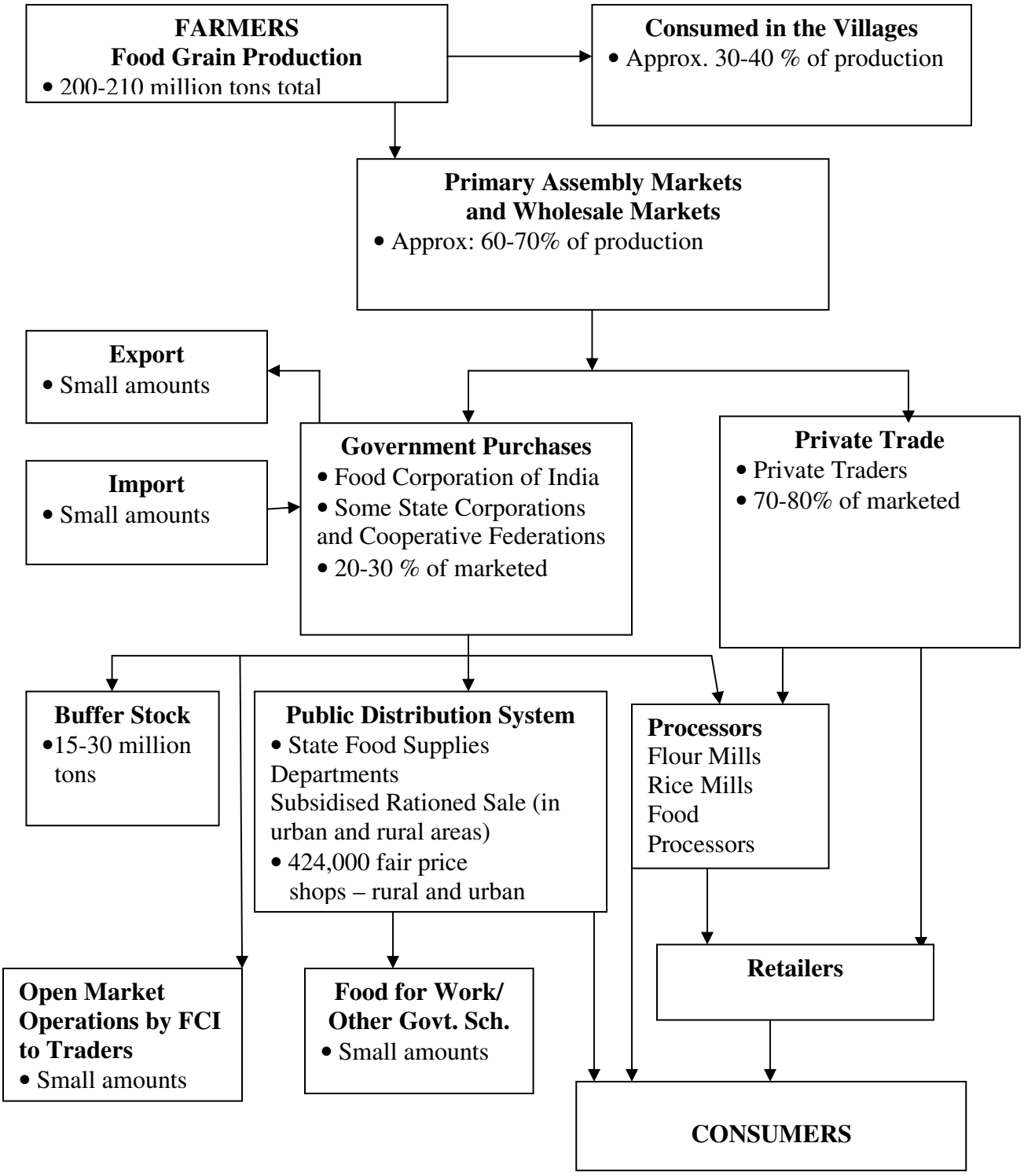
The Wheat Marketing System

Consequent to the severe food grain crisis of the mid-1960s as well as earlier experiences, the Government of India has developed a system of institutions with the objective of supporting, controlling and stabilizing foodgrain prices in India, and seeking to assure basic food availability at reasonable prices to the people. The system includes the Commission on Agricultural Costs and Prices (CACP), the Food Corporation of India (FCI), and State Civil Supplies Corporations/Departments. The CACP studies costs, prices and markets, and recommends prices to the national government. The national government's grain management including procurement, transport, storage and release of the grain is done mainly by the FCI. Grain distribution is done through the public distribution system (PDS) via state governments (State Civil Supplies Corporations/Departments) and over 400,000 fair price shops (ration shops) spread throughout the country in both rural and urban areas.

Figure 3 provides an outline of the grain marketing system in India. The government is involved in both direct market operations/ interventions, as well as in the development of infrastructure, and a legal framework for the private marketing system. The private system includes regulated and unregulated wholesale markets and sub-markets totaling to about 6800 - both rural (primary) and urban, over 26,930 rural periodic markets, and a

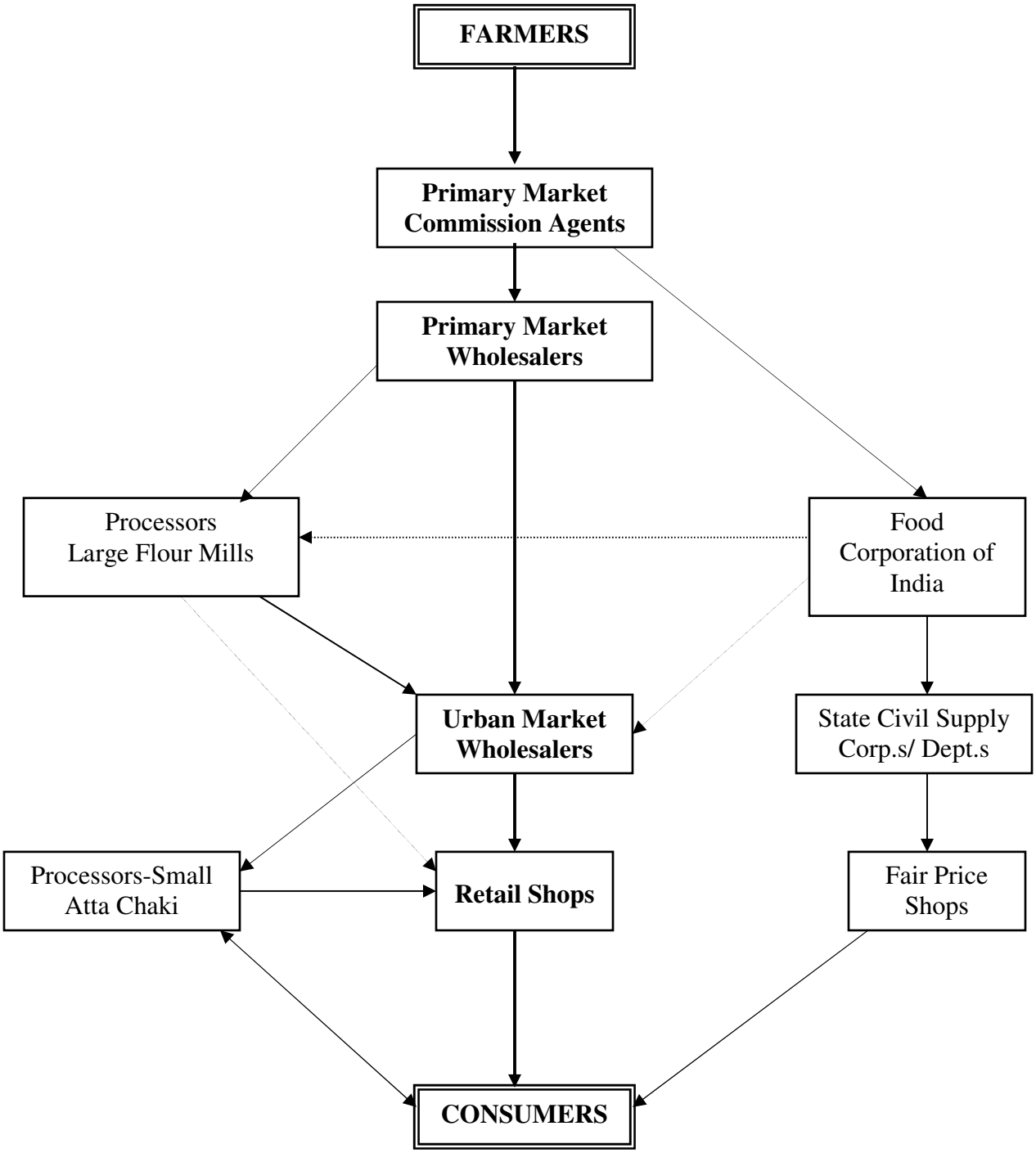
huge number of private retail shops. Very recently. in the early 2000s, three national multi-commodity exchanges have been added to this system and have introduced electronic trading and futures markets.

Figure 3: Outline of India's Grain Marketing System



A simplified picture of the current marketing system for wheat in India (based on observations in the field survey of this study) is given in the Figure 4 below. This includes both the private and the public system, and the traders and the processors.

Figure 4: Simplified Outline of the Marketing System of Wheat in India
(Based on the Study Survey Observations)



Over the last decade, the more active MSP (minimum support price) and procurement policies of the Government of India (GOI) may have significantly reduced the role and activities of private traders. There appears to be very little private stocking of wheat, perhaps, mainly because the GOI purchases and stocks large quantities. The uncertainty regarding the price and volume of sales from large GOI stocks often make it difficult for private traders to play their role in the market in a significant way. Some consider the current situation a de facto nationalization of wheat trade.

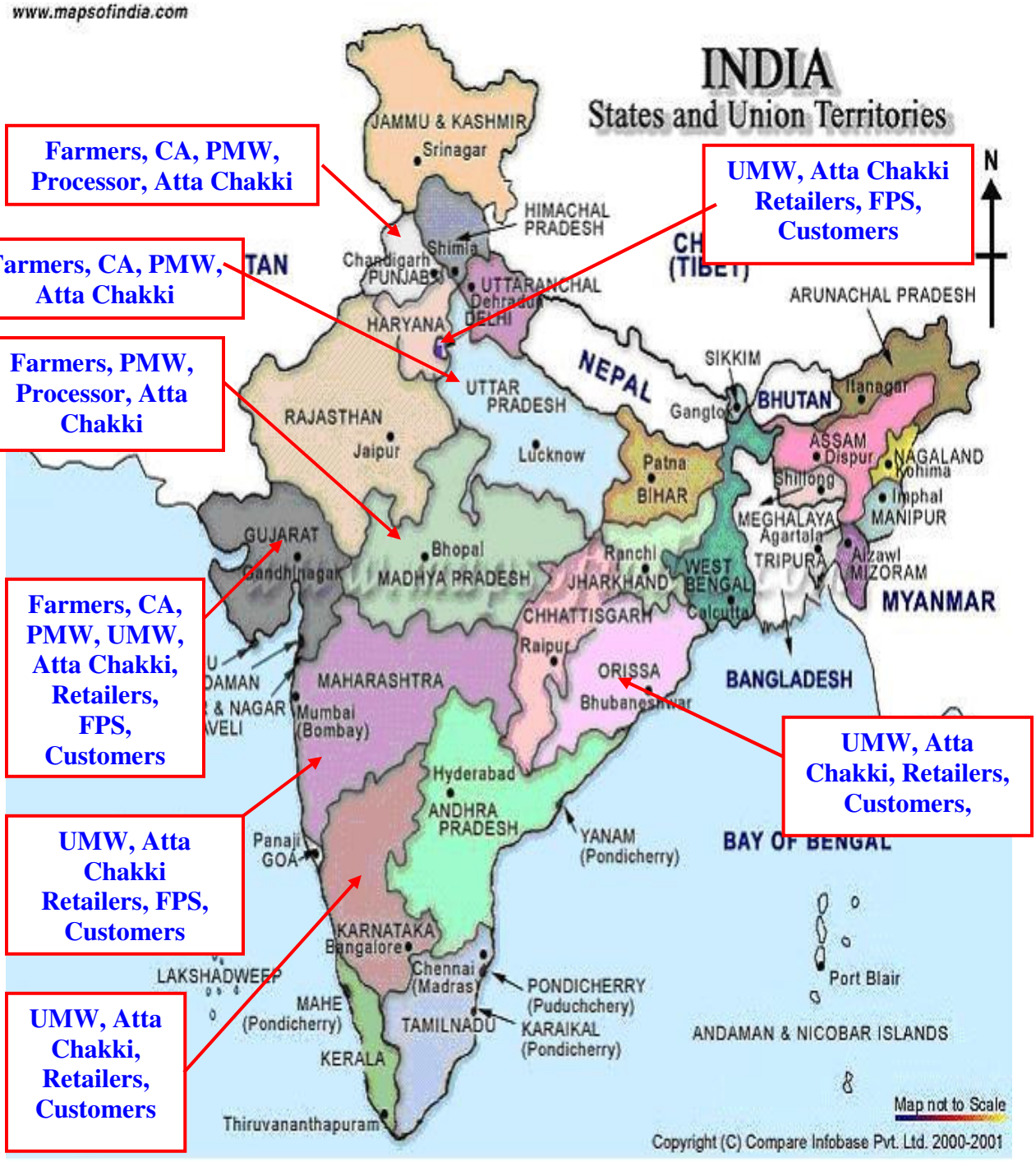
The government's purchase and sale policies, together with stock holding and movement restrictions under the Essential Commodities Act, state policies, and taxation policies, may have inhibited private investment in improving grain marketing infrastructure (World Bank, 1999). Reports are also there about FCI's (Food Corporation of India) inefficiencies in handling, transporting and storing government held grain. Other observations such as the large numbers of intermediaries involved in market transactions, bagged handling and storage, lack of grades, standards and inspections, etc. also provide a basis for hypothesizing that India's grain markets may be inefficient.

Some economists argue that the government is more efficient than private traders, but, with the FCI setting the base, there might be less incentive for private traders to be more efficient. Given the major role of wheat and rice in both farm income and consumer expenditures in India, inefficiencies in marketing would impose significant costs on producers, consumers, and the economy as a whole. The present study is being taken up in this background. This paper focuses more on the quality and efficiency aspects.

Data

Field level study was carried out in 7 states of India. This included Punjab, Uttar Pradesh, Delhi, Gujarat, Maharashtra, Karnataka and Orissa. The states were selected to cover a diversity of market conditions, production and consumption situations and include wheat surplus and deficit states. The study sought to cover the whole marketing chain: farmers, traders, processors, retailers and consumers – a whole range of important market participants were sought to be identified and covered. As mentioned earlier, wheat is produced largely in the north, central and west regions in India. There are producing, producing-consuming and consuming areas. The nature of sampling, therefore, had to be varied, and the Figure 5 below shows the participants and locations that the survey sought to cover in different the states.

Figure 5: Map Showing the Sampling Plan



CA= Commission Agents, PMW=Primary Market Wholesaler, UMW=Urban Market Wholesaler, Atta Chakki=Small Flour Mills, Processor=Large Roller Flour Mills, FPS=Fair Price Shops

Structured survey questionnaires were designed and information was collected through them, as well as through visits, meetings and interviews. Relevant secondary data/ information was also collected and analyzed. For the public system, information available from secondary sources was used. The main focus of the study was, however, kept the private marketing systems, since numerous studies as well as secondary data are available on the public systems.

The sample size covered is shown in the Table 3 below. This is based on the sampling plan/ distribution, the presence/ absence of different participants at different locations, the need for sampling, the response, time and resource limitations.

Table 3: Survey Sample Coverage

	No.
Farmers	120
Commission Agents	26
Primary Market Wholesalers	18
Urban Market Wholesalers	15
Atta Chakki	22
Processors (Large Roller Flour Mills)	4
Fair Price Shops	6
Retailers	28
Consumers	100
Overall Total	339

Results from Farmer Responses

Variety Decision and Productivity

Table 4 below gives the distribution and characteristics of the varieties that are selected by the farmers. It indicates that 17 different varieties were observed to be grown by the farmers. Of these varieties the most commonly reported are V343, Tukadi, Lok1, and V306. The varieties vary substantially in the quality rating given by the farmers which ranges from 1 to 5. The varieties which get among the highest rating are Kalyan, Tukadi, Lok1, and V306. The varieties also differ substantially in their yields. Some of the varieties such as V306, Lok1 and Tukadi have relatively low yields but high quality rating. It appears that multiple criteria are used by the farmers for variety selection, but yield and quality may be very important.

Table 4: Variety-wise wheat production, area, and productivity						
Sl. No.	Variety Mentioned	N	Avg. quality rating by farmers	Total Area (ha.)	Production (Qtl.)	Yield (Qtl./ha.)
1.	2687	1	4.0	2.4	170.0	70.8
2.	Kalyan	1	5.0	1.2	70.0	58.3
3.	347	2	3.5	6.8	380.0	55.9
4.	343	31	3.8	102.2	5268.5	51.5
5.	2003	1	3.0	1.6	80.0	50.0
6.	Tukadi	22	4.5	35.5	1711.6	48.3
7.	Pusha	7	3.9	11.4	535.0	47.1
8.	Sonera	1	1.0	0.5	22.0	44.0
9.	Gold20	2	1.5	16.0	550.0	34.4
10.	173	6	2.7	40.4	1335.0	33.0
11.	Lok	25	4.2	138.3	4552.5	32.9
12.	Msakti	3	3.7	22.8	730.0	32.0
13.	Malraj	1	3.0	8.0	240.0	30.0
14.	RR21	4	3.3	3.5	85.0	24.1
15.	Malvi	9	3.6	21.6	347.0	16.1
16.	306	14	4.6	92.7	1325.0	14.3
17.	Dada	7	4.0	19.6	201.0	10.3
	Average		3.9	69.3	2588.3	36.9

The variety selection decision is further examined in Table 5 below. Whereas it is not surprising to see that 95 percent have indicated good yield as a criteria, it is significant that 92 percent indicate the ease of marketing as a major consideration. Higher price is also indicated by 75 percent and consumer preference also figures at 52 percent. These responses show the growing market consciousness related to quality of the farmers in variety selection. Traders do not play a major role in advising on this and the government also does not seem to have a large influence. Experience based advise from other farmers plays a major role is indicated by 85 percent of the farmers.

Table 5: Basis of selection of varieties to grow by the farmers	
Reason-Consideration	Percentage indicating
Advice from Traders	13.4
Advice from other Farmers	84.8
Advice from Agri Depts.	48.2
Consumer Preference	52.6
Good Yield	94.6
Higher Price	75.0
Easy to market/sell	92.0
Suitability for Storage	30.4
N	120

Sale by the farmers

Where do the farmers prefer to sell? In a change from the past, findings indicate that very few sell at the farm gate or in the village – Table 6. 94 percent of the farmers indicate that they sell in the grain markets in nearby towns. This indicates increasing farmer awareness, mobility, and market and transport development.

Table 6: Where do farmers sell	
Market place	Percent
Farm Gate	5.0
Local Village Market	0.8
Grain Market in nearby town	94.2
Total	100.0

To whom or through whom the farmers sell their wheat? Information in the Table 7 below indicates that there is a large variation across the states in this aspect. Whereas almost all the sale transactions in Punjab and U.P. are to commission agents, almost all the transactions in Madhya Pradesh are to traders or processors. In the case of Gujarat, a food deficit state, the majority of transaction are through commission agents, a large number sell directly to consumers.

Table 7: Frequency of wheat sales to different agents across states (Percent)					
Sold to	Gujarat	Punjab	MP	UP	Total
Commission Agents	61.4	100.0	0.0	96.7	57.8
Trader/Processor	5.3	0.0	100.0	0.0	28.3
Consumer	33.3	0.0	6.8	3.3	13.9
Total	100.0	100.0	100.0	100.0	100.0

Figure 6 shows the distribution of quantities sold per transaction. It brings out the large number of small transactions – and there for the importance of the assembly function that the primary markets and their traders/ commission agents play. Figure 7 shows the distribution of the prices of sale. It indicates that the range of prices is large from Rs.580 to 1000 per quintal. However, the large majority of transactions fall in the range of Rs.600 to 650. This shows substantial hovering of the prices around the minimum support price of Rs.620 to 630.

Figure 6: Distribution of the quantity sold

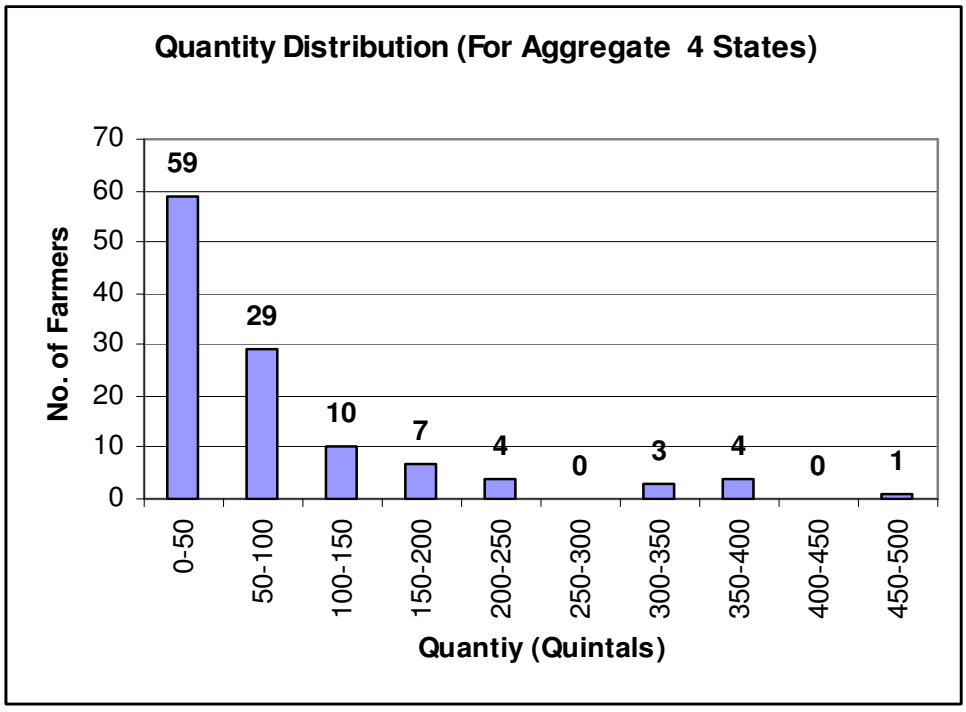


Figure 7: Distribution of the prices received

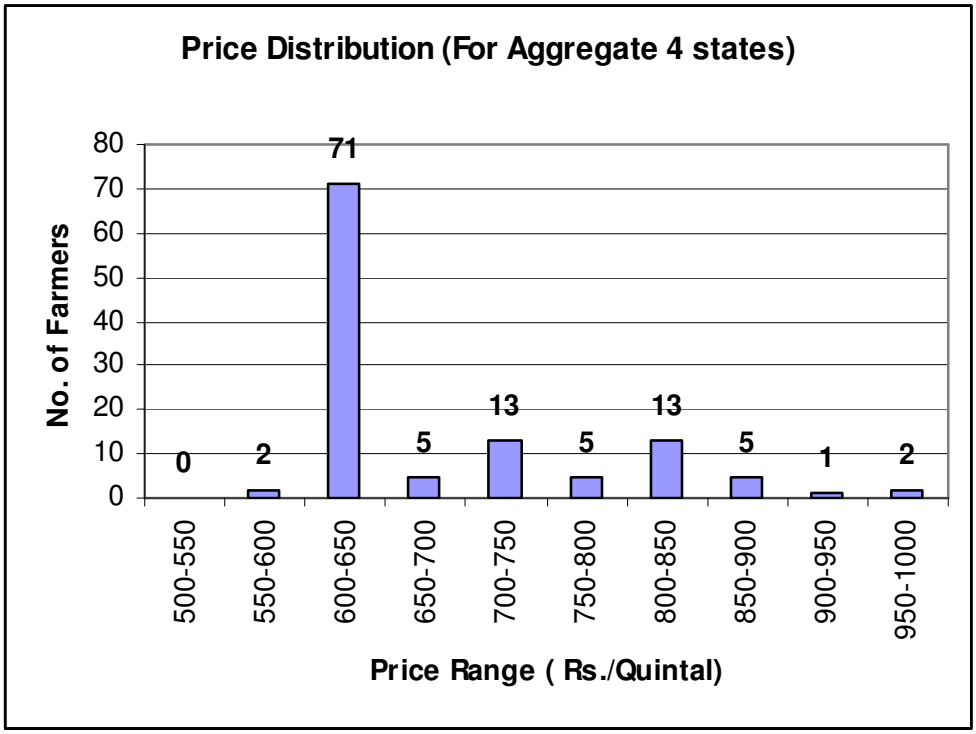


Table 8 below gives the profile of the production and marketing by farm size. It indicates that the productivity is the highest on marginal farms followed by medium farms, and lowest on large farms indicating an inverse relationship to scale. The marketed surplus increases with the farm size: marginal farmers indicate sale of 66 percent of their produce whereas the other farmers a sale of 80 to 86 percent of their produce. The average price realized is the highest for large farms at Rs.734 per quintal and the lowest for marginal farms at Rs.653 per quintal, indicating that the large farms get better prices.

Table 29: Analysis by farm size

Farmer type (ha range)	Average Area Cultivated (ha.)	Productivity (Qtls./ha)	% sold	Average price realized (Rs./Qtls)
Marginal <1	0.48	57.08	66%	653.00
Small 1-2	1.00	37.94	84%	700.31
Semi Medium 2-4	1.66	32.39	81%	674.77
Medium 4-10	3.68	42.33	86%	688.95
Large >10	12.36	28.79	80%	733.94

Services Provided by Market Intermediaries to the Farmers

What are the services provided by the primary market agents to the farmers in return for their commissions and margins? Table 9 below examines the responses on marketing services provided. It indicates that the farmers avail of the services but frequently do not receive help in terms of market information or price negotiation. The main services commonly provided by them are auction, collecting payments from buyers/ government, payment of market fees and other taxes, and cleaning. Other services including quality enhancing services such as grading, testing, treatment and storage are frequently not provided.

Table 9: Farmers Response on Marketing Services provided by Primary Market Commission Agents and Traders

	(Percent)						
	Never	First time	Sometime	Mostly	Always	Total	Average
	1	2	3	4	5		
1. Whether services availed of	0.0	0.0	20.2	79.8	0.0	100.0	3.8
2. Providing market information : Price / Arrival / Demand	71.1	0.0	14.0	7.9	7.0	100.0	1.8
3. Price negotiation	46.0	0.9	31.9	5.3	15.9	100.0	2.4
4. Open Auction	0.9	0.0	0.0	6.3	92.9	100.0	4.9
5. Secret Bidding	100.0	0.0	0.0	0.0	0.0	100.0	1.0
6. Simple transaction	82.1	0.0	17.0	0.0	0.9	100.0	1.4
7. Contract selling	100.0	0.0	0.0	0.0	0.0	100.0	1.0
8. Payment of market fees and other taxes	50.4	0.0	1.8	0.9	46.9	100.0	2.9
9. Collect payment from buyer/ government agency	26.5	0.0	4.4	0.9	68.1	100.0	3.8
10. Transportation	98.2	0.0	0.9	0.0	0.0	100.0	1.0
11. Loading / unloading	48.7	0.0	8.0	11.5	31.0	100.0	2.7
12. Cleaning	49.1	0.0	2.7	2.7	45.5	100.0	3.0
13. Grading	60.0	0.0	0.9	1.8	37.3	100.0	2.6
14. Testing	63.3	0.0	0.9	0.9	34.9	100.0	2.4
15. Storage	63.3	0.9	0.9	0.9	33.9	100.0	2.4
16. Treatment of grains	69.7	0.0	7.3	0.0	22.9	100.0	2.1

Provision of other services is examined in the Table 10 below. Agriculture related services are generally not provided by the them. There is a limited role in terms of credit services that is indicated including consumption loans – but not very common. Spot cash

payment or part-payment is the main service. On the whole the services provided by the primary market intermediaries to the farmers remains quite limited and has not improved or evolved much.

Table 10: Farmers Response on Other Services Provided by Primary Market Commission Agent and Traders

	(Percent)						
	Never	First time	Sometimes	Mostly	Always	Total	Average
	1	2	3	4	5		
1. Supply inputs : Seeds/fertilizers/ pesticides	93.9	0.0	4.4	0.9	0.9	100.0	1.1
2. Arrange inputs : Seeds / fertilizers / pesticides	92.1	0.0	4.4	2.6	0.9	100.0	1.2
3. Advice about farming practices / recommendations	93.0	0.0	6.1	0.0	0.9	100.0	1.2
4. Advice about crop insurance	97.3	0.0	1.8	0.9	0.0	100.0	1.1
5. Crop loan / advances (for farming)	61.3	0.0	21.6	8.1	9.0	100.0	2.0
6. Consumption loan / advances	54.5	0.0	33.9	3.6	8.0	100.0	2.1
7. Charge interest	82.8	0.0	0.0	2.0	15.2	100.0	1.7
8. Assistance for loans through banks	69.7	0.0	25.7	2.8	1.8	100.0	1.7
9. Spot cash payment (Full payment)	1.8	0.0	8.8	17.7	71.7	100.0	4.6
10. Spot cash payment (Part payment)	57.1	0.0	20.0	2.9	20.0	100.0	2.3
11. Dated cheque (Full payment)	99.0	0.0	0.0	0.0	1.0	100.0	1.0
12. Dated cheque (Part payment)	100.0	0.0	0.0	0.0	0.0	100.0	1.0
13. Adjust against advances	79.0	0.0	14.3	1.0	5.7	100.0	1.5
14. Pay interest on balance amount	97.7	0.0	0.0	0.0	2.3	100.0	1.1

Primary Market Commission Agents and Wholesalers/ Traders

Purchase

Tables 11 below describe the place and source of the commodity in the market. It indicates that all the transactions take place in the market. Table 34 indicates that the purchasing was done in 80 percent of the cases from the farmer, in the remaining cases purchases were made from other commission agents, traders and brokers. Thus, by and large purchase directly form the farmers.

Table 11: Primary market commission agents and traders: Buying: Where and from Whom do they buy (Percent)	
Where	
Market	100
Farm Gate/ Village	0
Total	100
From Whom	
Farmer	79.55
Other Traders	2.27
Other Commi. Agents	15.91
Brokers	2.27
Total	100.00

Sale

Table 12 below indicates that the sale transactions all takes place in the market. About 40 percent of the sale transactions are to wholesalers, 22 percent to retailers, and 28 percent to processors. Government agents constitute about 8 percent of the sale transactions and consumers none.

Table 12: Primary market commission agents and traders: Selling: Where do they sell (Percent)	
Where	
Market	100
Elsewhere	0
Total	100
To Whom	
Urban and Other Wholesalers	40.68
Retailers	22.03
Processors	28.81
Govt. Agents	8.47
Consumers	0.00
Total	100.00

Factors Determining the Price

Table 13 below gives the response of primary market commission agents and traders to the factors which in their opinion determine the prices. The results indicate that the following factors are of greater than average importance: income growth, user industry development, processing technology, processed products demand, international supply, production technology/ variety, labour cost, market facilities, method of transaction, storage infrastructure, and various government policies. Government policies are indicated to have a substantial influence. Quality of supply is also indicated to be of importance.

Table 13: Primary Market Commission Agents and Traders: Response on Price Determining Factors

	Importance - Percent					Avg. Rating
	5	4	3	2	1	
Demand Factors						
Local demand	22.7	18.2	29.6	2.3	27.3	3.1
National demand	0.0	4.8	38.1	4.8	52.4	2.0
International demand	12.2	7.3	39.0	2.4	39.0	2.5
Income growth	39.5	18.6	30.2	4.7	7.0	3.8
User industry development	12.2	17.1	48.8	14.6	7.3	3.1
Processing technology	18.2	15.9	38.6	11.4	15.9	3.1
Processed product demand	9.5	19.1	47.6	9.5	14.3	3.0
Quality-Variety	2.4	4.9	36.6	14.6	41.5	2.1
Supply Factors						
Local Supply	9.1	18.2	29.6	0.0	43.2	2.5
National Supply	7.0	11.6	46.5	11.6	23.3	2.7
International Supply	20.0	7.5	52.5	7.5	12.5	3.2
Production technology/ variety	14.6	26.8	43.9	7.3	7.3	3.3
Labour availability/cost	18.0	33.3	35.9	2.6	10.3	3.5
Weather	15.9	13.6	38.6	6.8	25.0	2.9
Season/month	7.5	10.0	55.0	2.5	25.0	2.7
Market Factors						
Number of buyers	4.6	15.9	18.2	11.4	50.0	2.1
Number of sellers	7.0	11.6	25.6	14.0	41.9	2.3
Market facilities	19.1	19.1	33.3	14.3	14.3	3.1
Communication facility	6.8	25.0	38.6	13.6	15.9	2.9
Method of transaction	32.6	25.6	20.9	9.3	11.6	3.6
Transport infrastructure	7.0	16.3	48.8	9.3	18.6	2.8
Storage infrastructure	36.6	22.0	24.4	2.4	14.6	3.6

Government Policies						
Govt. price support policy	25.6	23.1	33.3	0.0	18.0	3.4
Govt. buffer stocking policy	20.5	33.3	28.2	2.6	15.4	3.4
Govt. sales/release policy	27.0	24.3	21.6	13.5	13.5	3.4
Govt. market restrictions/ procedures	21.6	32.4	24.3	8.1	13.5	3.4
Govt. market/sales taxes	21.6	37.8	27.0	5.4	8.1	3.6
International trade policy/ WTO	29.7	27.0	8.1	10.8	24.3	3.3

Importance Rating:

Very Important ↑ 5 ↑ 4 Important ↑ 3 ↑ 2 Not Important ↑ 1

Satisfaction with the Marketing System

Table 13 below summarizes the responses on the satisfaction with the current marketing system. Most farmers rate the system to be medium, indicating considerable scope for improvement. In general the traders seem to be happier with the system than the farmers, particularly the primary market commission agents and traders.

Table 14: Rating of the Marketing System (percent response)

Response	Farmers	Primary Market CAs and Traders	Urban Market Traders
Excellent (5)	7.0	22.7	0.0
Good (4)	35.7	36.4	66.7
Medium (3)	47.8	36.4	33.3
Unsatisfactory (2)	9.6	2.3	0.0
Poor (1)	0.0	2.3	0.0

Retailers

The survey of the retailers showed that they carried at least seven varieties of wheat. The most frequently carried varieties were 'Lok-1', followed by 'Gujarat Tukadi' and 'MP Tukadi'. There was great variation in the quantity that the retailers buy – it ranged from 25 quintals per year to 1000 quintals per year. Table 15 summarizes the purchase data, giving the variety, quantity purchased, prices and sources of buying. The prices paid also varies substantially by variety. The variety 'Daudkhani' has the highest price of Rs. 1250 per quintal and is the most expensive variety considered to be of the highest quality. The lowest price was for the variety Deshi Tukadi - Rs. 800. The most popular Lok-1 had an average price of Rs. 986, MP Tukadi the average price of Rs. 1106, followed by the 'Sharbati' (Rs. 1053), and Gujarat Tukadi (Rs. 1009). The data frequency suggests greater preference for the mid-range quality and price varieties - the highest and the lowest prices and quality are rare. The major source of wheat was the wholesalers.

Table 15: Wheat Buying by the Urban retailers – Variety, Quantity, Price and Source								
Varieties	**% N**	**Quantity per yr. (Quintal)**			**Price (Rs./quintal)**			**Source**
		Min	***Max***	***Average***	***Min***	***Max***	***Average***	
Lok-1	64.3	30	1000	275	850	1100	986	Wholesalers, Comm.Agent
Gujarat Tukadi	35.7	25	500	213	850	1150	1009	Wholesalers, Comm.Agent
MP Tukadi	32.1	25	2400	396	850	1300	1106	Wholesaler
V-2189	21.4	30	300	141	775	1000	904	Wholesaler
Sharbati	10.7	72	300	204	1050	1060	1053	Wholesaler
Deshi Tukadi	3.6	360	360	360	800	800	800	Wholesaler
Daudkhani	3.6	200	200	200	1250	1250	1250	Comm.Agent

Factors influencing retailers' buying decision

Table 16 presents the results on the factors influencing the retailers' decision on the variety and the quantity to buy. The most important consideration for variety as well as quantity is the customer demand. For the decision on the quantity, the next important factor was the ability to store in the shop. Availability was also an important consideration influencing the choice of variety. Other factors such as margins obtained, ease of transportation, and availability of credit from the seller are somewhat important. Thus, when it comes to the retailer, consumer demand becomes the main consideration.

Table 16: Importance of Different Factors in Retailer decision on Variety and Quantity by (range 4 to 1)		
Factors Influencing Retailers' Decisions	**Average Rating for Decision on Variety**	**Average Rating for Decision on Quantity**
Customer demand	4.0	3.7
Availability	1.7	1.6
Ability to store in your shop	1.4	2.7
Ability to preserve	1.0	
Margins obtained	1.5	1.4
Ease of transportation from seller (distance, modes of transport from buying point)	1.6	1.6
Payment – Credit by seller	1.5	1.6

Variations in retail prices for different varieties across different location also provide a glimpse into the market dynamics. Table 17 gives the prices of different varieties in five survey cities. It shows how prices vary by variety, and how they increase as one goes from the producing areas in the north and west, to the non-producing states in the east and south.

Table 17: ***Prices of Different Varieties in Different Cities***

Rupees per kilogram

Locations (North-West to South-East)	Average Retail Prices						
	MP Tukadi	Deshi Tukadi	Sharbati	Lok-1	Gujarat Tukadi	2189	Daud-khani
New Delhi	11.33	9.00	-	-	-	-	-
Ahmedabad	-	9.87	-	9.33	9.81	-	13.00
Pune	13.41	-	-	11.58	13.33	10.25	-
Bhuba-neshwar	-	-	11.66	-	-	-	-
Bangalore	-	-	-	12.00	-	-	-

Table 18 give the findings on the purchase of wheat products by the retailers. Most of the purchases are made from wholesalers. The prices differ substantially from product to product, and also depend on whether they are packaged, loose and branded.

Table 18: Source of Buying, Quantities and Price Range of Wheat Products

Product	**Source**	**Quantity/Yr Kg**	**Price (Rs./ Kg.)**		
			Packaged & Branded	**Loose**	
				Branded (local brands)	***Unbrand-ed (store offered)***
Atta (whole wheat flour)	WS(60), OR (10), P (5), D (25)	9303	12.93	10.42	11.50
Maida (fine wheat flour)	WS(85), OR (10), P (5), D (0)	5017	14.75	11.55	9.33
Sooji (wheat germ)	WS(85, OR (10), P (5), D (0)	3915	15.00	11.52	10.07
Note: WS=wholesaler, OR=other retailer, P=processor, D=distributor					

Consumers Behaviour and Preferences

Main Cereal Consumed

Cereal consumption preferences vary substantially from state to state. Table 19 gives the results on the pattern. In the sample, 55 per cent consume mainly wheat, 28 per cent consume mainly rice and 17 per cent consume both rice and wheat equally. The specific consumption preference with respect to wheat and rice varies across the states. In the north and the west, the people are mainly wheat consumers, whereas in the south and east they are mainly rice consumers. With the mobility and changing preferences, however, even in the south and east now, there are sizable numbers who consume both wheat and rice.

Table 19: Consumers: Main Cereal Consumed (percent)

States	*Wheat*	*Rice*	*Wheat & Rice about Equally*
Delhi	70	5	25
Gujarat	90	0	10
Maharashtra	90	10	0
Orissa	10	60	30
Karnataka	15	65	20
Overall	55	28	17

Consumption Pattern of Wheat

Table 20 gives the consumption patterns with respect to wheat and wheat products. In Gujarat, consumers prefer to buy whole wheat as they prefer to convert it into flour as and when they need. In Delhi too, 80 per cent of consumers prefer to buy wheat and then convert into wheat flour; but about 22 per cent of people prefer to buy Atta. On the other hand, in Karnataka and Orissa, the consumers prefer to buy Atta instead of wheat. In Gujarat, Orissa and Karnataka, most consumers also buy Sooji, but in Maharastra, only 65 per cent buy Sooji. We also observe that in Delhi and Maharastra, fewer consumers buy Maida compared with consumers in the other States.

Table 20: Consumption Preference of Consumers				
State	**Wheat**	**Atta**	**Maida**	**Sooji**
Delhi	80%	22%	11%	80%
Gujarat	100%	0%	78%	100%
Maharashtra	95%	5%	30%	65%
Orissa	0%	100%	75%	100%
Karnataka	0%	100%	84%	100%

The average monthly household consumption of different food products as found in the survey is given in Table 21. Delhi shows the maximum consumption of wheat – about 31 kilograms, followed by Maharastra (about 23 kilograms) and Gujarat (about 20 kilograms). Consumers in Orissa and Karnataka are basically rice consuming: the average consumption of rice in these states is about 25 kilograms in Orissa and about 23 kilograms in Karnataka. The consumption of Atta in Maharastra is about 20 kilograms where as in Delhi and Orissa is about 15 kilograms. The quantity of Atta consumption in Gujarat low since consumers prefer to buy wheat and convert wheat into atta – the overall Gujarat figure may be underestimated. In relative terms, Sooji and Maida are consumed in lesser quantities.

Table 21: Consumption Pattern of Wheat and Wheat Products (Average Monthly Consumption) Kg				
States	Wheat	Atta	Maida	Sooji
Delhi	31.3	15.0	1.5	1.3
Gujarat	19.8	2.0	0.9	1.2
Maharashtra	23.4	20.0	1.1	1.5
Orissa	-	15.0	1.7	2.1
Karnataka	-	14.5	1.6	2.2

The consumers' preference of the source for buying wheat was also examined. Table 22 gives the factors that influence the choice of the source of buying. The quality of wheat available emerges as the most important factor – indicated as very important by 65 percent of consumers. This shows that the consumers are very quality conscious in the purchase of the wheat. For 63 per cent of consumers, the purity of the wheat is also very important. The cleaning of wheat, a service provided by retailers or wholesalers, is a very important factor that influence their choice of buying source.

Table 22: Factors influencing decision on Source of buying wheat (percent)					
	V. Imp. 5	Imp. 4	Avg. 3	Not so Imp. 2	Not at all Imp. 1
Overall quality of wheat available	65	25	9	0	2
Cleaning of wheat	63	14	12	4	7
Freshness of stock	61	21	16	0	2
Correct weight	60	30	11	0	0
Door delivery	53	7	5	4	32
Low prices	49	19	19	5	7
Availability of diff. Varieties of wheat	46	16	14	7	18
Nearer to house	28	7	18	19	28
Credit availability	24	4	11	13	49

Reasons of preference between Wheat Grain and Wheat Flour

Findings indicate that the reasons for buying wheat grain rather than wheat flour are mainly concerns of purity, freshness and taste, but vary by location. In Delhi, 94 per cent of respondents said that when they do this because it is more hygienic and free from external matters. 89 per cent also felt that this method gives them fresh Atta and 78 per cent mentioned taste preference was the reason. In Maharashtra on the other hand 100 per cent of those practice this indicated taste preference was the key reason. For 78 per cent, hygiene was the other important reason. Thus, quality concerns are important.

In those states where people preferred to buy wheat products instead of wheat, respondents were asked about the reasons for this purchase preference. Note that the quantity of wheat consumed is generally lower in these states. The results are given this data in Table 23. Time saving (93 per cent), convenience (88 per cent), availability (83 per cent) are the most important reasons stated, followed by brand appeal (72 per cent), and habit (69 per cent).

Table 23: Reasons of preference of purchasing wheat products rather than wheat	
Reasons	**Percent response**
Time saving	93
Convenience	88
Availability	83
Brand Appeal	72
Habit	69
Saving of effort	53
Taste preference	50
Cost advantage	42
Insufficient facility to store / preserve whole wheat	39

Where relevant, we also asked the respondents the reasons for buying wheat products in loose form from the nearby flour mills rather than the branded packaged product. The predominant reasons cited were lower prices (69 per cent), availability in convenient quantities (65 per cent), and freshness (58 per cent). On the other hand we also asked those who prefer to buy branded and packed Atta instead of atta from the nearby flourmill, the reason. In this case, the dominant reasons were reliability of quality and reputation of brand (78 per cent each), good quality (75 per cent), availability (72 per cent), and reliability in quantity/weight (65 per cent).

Marketing Costs and Price Spread

This section attempts to estimate the marketing cost/ transaction cost across the whole marketing chain, based on the information collected in the survey. It also estimates the price spread from the farmer to the consumer. The market observations and information are relevant in this context are given in the appendix.

Examination and analysis of the data based on the available information gives the following average picture (over the information collected in the survey) of the transaction cost, given in the Table 24 below. The break-up of the aggregate is also shown in the Figure 8 below. The table also gives the average prices reported at each level. The corresponding figures may not match because the samples of farmers, traders and consumers are independent.

The findings indicate an average transaction cost of Rs. 266.08 per quintal from the farmer to the customer. 40 percent of this consists of transportation, followed by 15 percent in wastage, and 15 percent in taxes. Commission constitutes 10 percent, labor 10 percent, and brokerage 3 percent.

With respect to the price differential, as has been indicated, the corresponding figures may not match because the samples of farmers, traders and consumers are independent. However, following the buying stream, the farmer to consumer price differential comes to Rs. 331.79. Going by the selling stream, the differential comes to Rs. 401.53.

It can be seen from the Figure 9 below that the major price differential/ jump is between the rural primary market wholesaler selling price and the urban market wholesaler selling price. This is where substantial efficiency gains may be possible. The difference between what the consumer pays and what the farmer receives comes to Rs. 357.86. This can be compared to the transaction cost of Rs. 266.08. The marketing transaction cost is 74 percent of price differential, indicating margins totaling to 26 percent. The farmer receives 66 percent of what the consumer pays. The government channel marketing cost is reported to be Rs. 309 per quintal (FCI Annual Report), but this does not cover the whole chain and is not strictly comparable.

Table 24: Estimates of Marketing Costs and Price Spread for Wheat

	Farmer	Intermediaries				Retailer		Customer	Marketing Cost (Rs./Q)
	Selling	Buying	Selling	Buying	Selling	Buying	Selling	Buying	Total
		Rural		Urban					
		CA+PMW	CA+PMW	UMW	UMW				
Average Price (Rs./Q)	694.47	720.54	773.64	941.74	1040.00	994.33	1096.00	1052.33	
Commission (%)		1.77				1.50			
Taxes (%)		3.59			1.28				
Transportation(Rs./Q)	7.50	0.58	10.50	60.46	0.00	14.20		12.88	106.12
Bagging (Rs./Q)		19.86							19.86
Labor (Rs./Q)	2.81	5.60	4.00	3.97	4.45	5.40			26.23
Wastage (Kg./Q))	2.70	1.09	0.50	0.50					
Brokerage (Rs./Q)			3.00	4.90					7.90
Commission (Rs./Q)		12.75	0.00	0.00	0.00	14.91			27.66
Taxes (Rs./Q)		25.87	0.00	0.00	13.26				39.13
Wastage (Rs./Q)	18.75	7.85	3.87	4.71				4.00	39.18
Total Marketing Cost (Rs./Q)	29.06	72.51	21.37	74.04	17.71	34.51	0.00	16.88	266.08

Note: Corresponding price figures may not match because the samples of farmers, traders and consumers are independent.

Figure 8: Distribution of Estimated Marketing/ Transaction Cost of Wheat

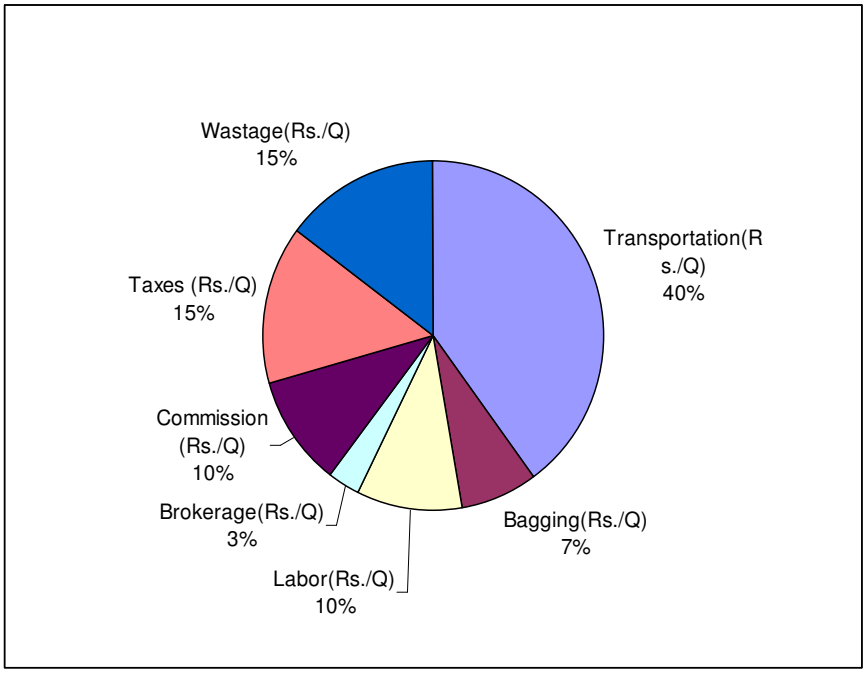
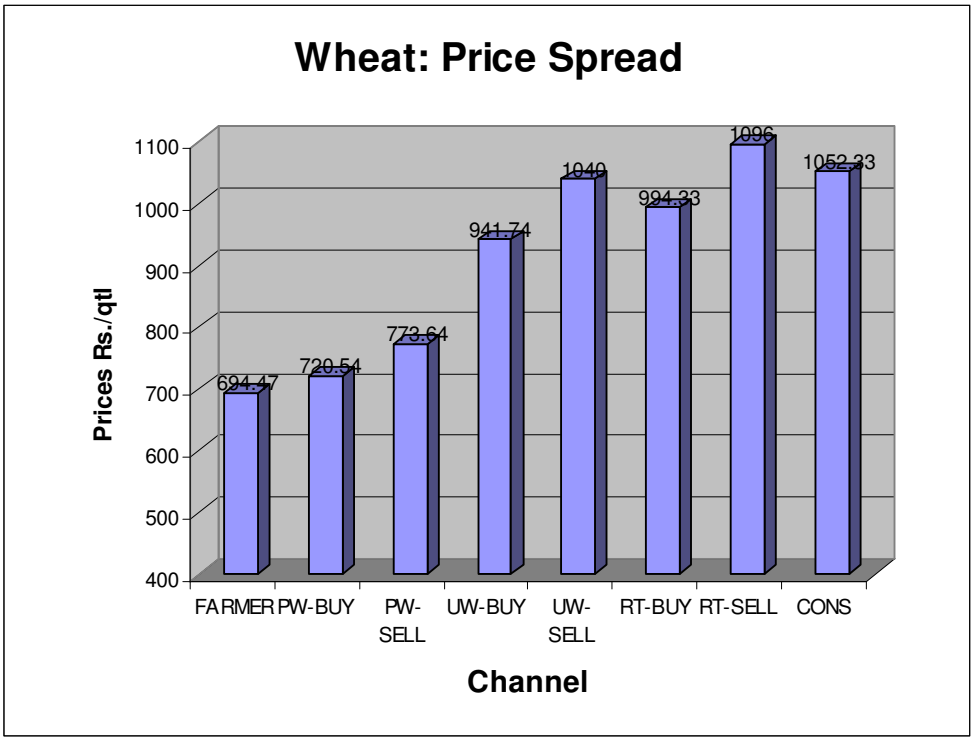


Figure 9: Observed Price Spread for Wheat from Farmer to Consumer



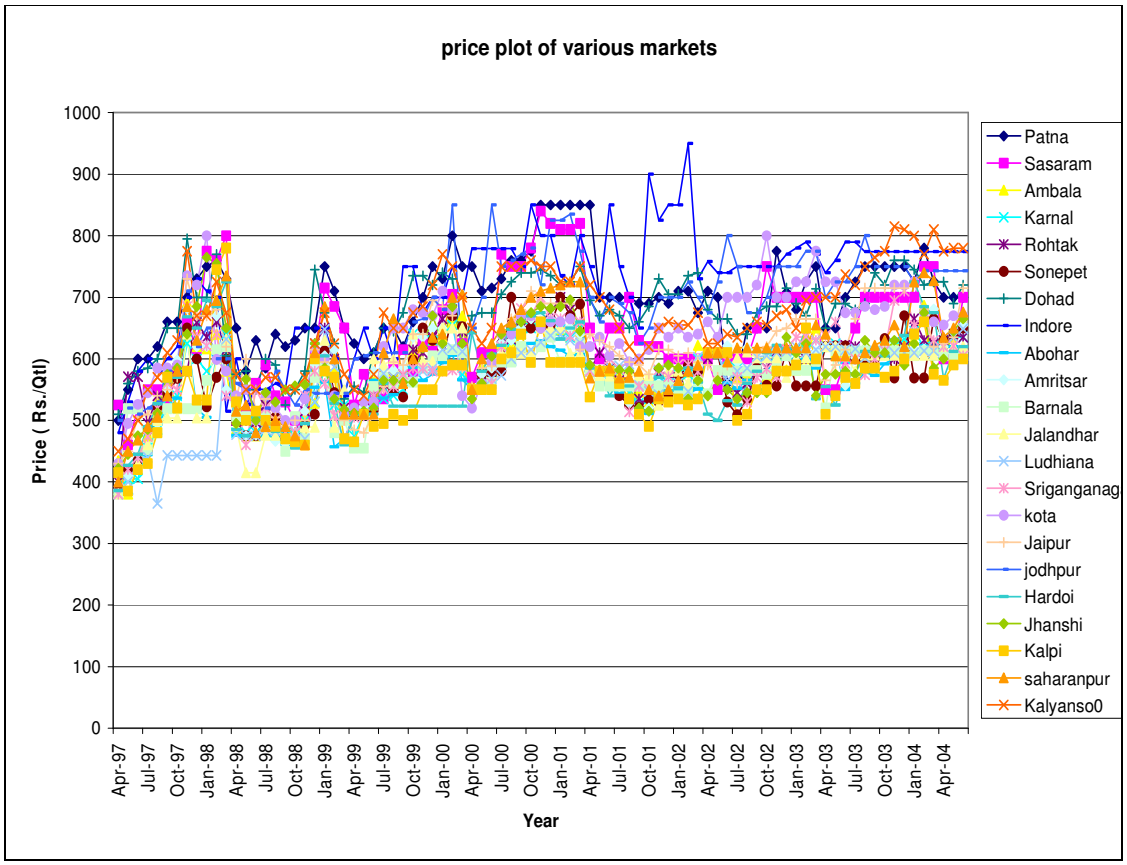
Note: Corresponding price figures may not match because the samples of farmers, traders and consumers are independent.

Market Integration

The survey data is not amenable for the analysis of market integration. Thus, secondary data on wheat prices was collected to examine the question of market integration. Spatial market integration refers to the market situation where the prices of the commodity being traded in different spatially separated markets, move together i.e. they exhibits co-movement and the price of one market has a smooth reflection of prices in the other markets. The ideal is referred to as Law of One Price (LOP). Market integration does not necessarily indicate market efficiency, but is considered indicative of the overall market performance.

In India wheat markets are significant and active mainly in eight states. In these states, there are many markets. So, market integration at state level (intra-state integration) and market integration at national level (inter state integration) can both be examined in and across these eight states to examine the wheat market integration in India. Monthly wheat price data from the 22 wholesale markets in the 8 states were compiled for the period April 1997 to June 2004. These were analyzed to examine the issue of market integration in wheat. A combined plot of the price data is given in Figure 10 below.

Figure 10: Wheat price data for 22 markets, April 1997 to June 2004



Intra State Market Integration Test

The Johansen test was applied for examining the Intra-State market integration. An important assumption behind the selection of the markets and varieties was to have comparability to the extent possible with the available data. By choosing comparable varieties of wheat in and across the states, we assume that price variability is due to demand-supply, spatial and seasonal effects and not due to the presence of variety differences. The results of the Johansen multivariate cointegration tests for intra-state regional market integration are presented in Tables 25. Gujarat, MP and Delhi were dropped here because they had data only for one market.

Table 25: Results of Multivariate Intra State Cointegration Test

H0:Rank=r	H1:Rank>r	Eigenvalue	Trace	5% Critical Value
Bihar				
0	**0**	0.2631	25.96**	12.21
1	**1**	0.0002	0.0149	4.14
Haryana				
0	**0**	0.3862	97.57**	39.71
1	**1**	0.3382	56.09**	24.08
2	**2**	0.2178	21.00**	12.21
3	**3**	0.0014	0.1215	4.14
Punjab				
0	**0**	0.4564	109.43**	59.24
1	**1**	0.2973	57.61**	39.71
2	**2**	0.2020	27.62**	24.08
3	**3**	0.0925	8.4530	12.21
4	**4**	0.0024	0.2060	4.14
Rajasthan				
0	**0**	0.2506	49.86**	39.71
1	**1**	0.1640	25.33**	24.08
2	**2**	0.1102	10.11	12.21
3	**3**	0.0022	0.19	4.14
Uttar Pradesh (UP)				
0	**0**	0.3572	79.88**	39.71
1	**1**	0.2411	42.32**	24.08
2	**2**	0.1984	18.87**	12.21
3	**3**	0.0009	0.0785	4.14

In the tests above, the intra-state integration of wheat markets has been examined by investigating the linear long-run relationship between the prices. Trace tests show one cointegrating vector for Bihar, three for UP and Haryana. Since the number of price series included is two for Bihar, four for Haryana and UP, the number of common stochastic trends turns out to be one for these three states. The number of common stochastic trends is determined by subtracting the number of cointegrating vectors from the dimension of the impact matrix given by the number of variables (n) included in the VAR test. The finding of n - 1 cointegrating vectors implies that all the prices contain the same stochastic trend and so are pair-wise cointegrated. This suggests that the weak version of the LOP holds for Bihar, Haryana and UP. The cointegration results for the Punjab and Rajasthan indicate that even though the regional markets are integrated, the LOP does not hold. The results of the trace for Punjab and Rajasthan reveal two and three cointegrating vectors respectively. This indicates the presence of two common stochastic trends, suggesting that the prices are not pair-wise cointegrated. The results are summarized in Table 26 below. The results indicate that the weak LOP (Law of One Price) exists in Bihar, UP and Haryana, but not in Punjab and Rajasthan.

Table 94: Summary of Intra State Spatial Integration Tests

State	No. of cointegrated Vectors	No. of Common Stochastic Trends	LOP presence
Bihar (2*)	1	1	Yes
Haryana (4)	3	1	Yes
Punjab (5)	3	2	No
Rajasthan (4)	2	2	No
UP (4)	3	1	Yes

* Figure in parenthesis indicates the number of markets in that state which are under VAR test.

Inter-State Spatial Market Integration

To examine inter-state market integration, we have taken one representative market from each state. The selection of the market was based on comparability of varieties. We assume comparability of varieties going under the test, and representativeness of the 8 markets included in this test. The results are given in Table 27 below. The multivariate cointegration tests for inter-state integration of wheat markets reveals two cointegrating vectors and hence six common stochastic trends. This suggests that the Indian wheat market system represented by eight selected state markets is stationary in two directions and non-stationary in six directions. This implies that the prices of wheat in the six markets are strongly cointegrated to a long-run equilibrium and hence regional wheat markets across the states are well integrated. However, the presence of six common stochastic trends implies the absence of pair-wise cointegration of the prices, suggesting that the LOP (Law of One Price) does not hold even though the markets are integrated. This finding is supported of by Ghosh (2003), but contradicts Jha et.al (1997) which found that all market are pair wise integrated as well as nationally integrated.

Table 27: Inter-State Cointegration Rank Test Using Trace: Results				
H0:Rank=r	**H1:Rank>r**	**Eigenvalue**	**Trace**	**5% Critical Value**
0	**0**	0.3960	165.02**	140.74
1	**1**	0.3882	122.17**	109.93
2	**2**	0.2796	80.4142	82.61
3	**3**	0.2071	52.5417	59.24
4	**4**	0.1625	32.8147	39.71
5	**5**	0.0973	17.7399	24.08
6	**6**	0.0924	9.0431	12.21
7	**7**	0.0094	0.8033	4.14

Concluding Observations

Wheat is a major food grain crop in India and is now crucial to India's food security and economy. Wheat production has increased from 6 million tons in 1950-51 to about 70-75 million tons in early 2000s, making the largest contribution to the growth in food grain production. Since 70 percent of the production now comes to the market, the efficiency of the marketing system is crucial to farmer welfare, consumer welfare as well as government budgets and economic development. Concerns have been raised regarding this. This study examines the wheat marketing and its efficiency with a focus on the private marketing system.

The study finds that the farmers now almost invariably sell in the nearby primary markets rather than to village traders, indicating increasing awareness and mobility. The farmer choice of varieties is now becoming market oriented with quality and market acceptance appearing as almost as important as the yield. The study finds that typically, the market intermediaries provide hardly any special or value adding services or development, in return for the commissions and margins, other than conducting the transactions and making the payment. The farmers see considerable scope for improvement in the marketing system. However, the commission agent and traders seem relatively satisfied. Whereas market factors of demand and supply are seen as important, government policies are being seen as major determinants of prices.

The retailers are becoming increasingly conscious of consumer demand and quality, and increasingly keep different varieties of wheat and wheat products. There is considerable variation in the consumer demand for wheat across the country with the north and the west consuming more wheat, and the east and south consuming more rice. However, wheat has made inroads into food consumption in the east and the south. Direct buying, storing of wheat grain and own recourse to processing are common in the north and the west, whereas direct purchase of wheat products such as flour is the norm in the east and the south. The trend is towards greater direct purchase of processed wheat products, and within this from loose to packaged branded products.

The average total marketing cost of wheat is estimated to be of the order of Rs. 266 per quintal, and in this transportation has the largest share of 40 percent, commission and taxes make up 25 percent, and wastage another 15 percent. When compared to the consumer-farmer price spread (of Rs. 1052 to Rs. 694 per quintal), the marketing costs account for 74 percent of the spread, leaving 26 percent for margins – this may be considered fairly efficient but there is scope for improvement. On an average, the farmers receive 66 percent of what the consumer pays. The major price differential/ jump in the marketing chain is between the rural primary market wholesaler selling price and the urban market wholesaler selling price. There is scope and opportunity for improvement in this link. The government channel marketing cost is reported to be Rs. 309 per quintal, but this does not cover the whole chain and is not strictly comparable.

Examination of the question of market integration for wheat is difficult because of data and quality difference problems. The attempted test following the method of co-integration analysis using price data for eight markets for the period April 1997 to June 2004 indicates that nationally the markets are integrated but pair wise co-integration does not exist for all markets. The presence of six common stochastic trends implies the absence of full pair-wise co-integration of the prices, indicating that the LOP (Law of One Price) does not hold.

Appendix: Notes on Estimation of Marketing Cost and Price Spread

- Commission Agent (CA) is typically a facilitating chain member who buys and sells at the same price, but charges a commission on the transaction in the range of 1.5% to 2.5%, varying from market to market. The buyers pay the commission charges. Other costs and taxes such as mandi taxes, govt. tax and sales tax are paid by buyers. There are no CAs in some markets, and in some markets, CAs may also work as PMWs.
- Primary Market Wholesalers (PMW) purchase in the primary rural markets. They do not charge commission, but they earn on price differentials between buying and selling price. While selling to urban wholesalers, sometime they involve a broker to mediate. For this service the broker charges brokerage which is borne by buyers. Other costs incurred in this transaction are mandi tax, sales tax and government tax. As indicated, in some markets CAs also operate as PMWs.
- Urban Market Wholesalers (UMW) are based in urban markets. In this study, two types of urban market wholesalers have been observed: one who operates from the market, and the other who operates from outside the market. In case of Pune and Bangalore, UMWs are operating from the market and they pay mandi tax. In Pune, the mandi tax is 1.05% and in Bangalore it is 1.50%. In Bhubhaneshwar and Delhi, PMWs sell directly to atta chakki and retailers and so they do not incur any cost in the transition.
- In some markets, if sale is to flour mills then sales tax is 2%, else if sale is to traders then sales tax is 4%. In Gujarat only mandi tax is applicable - no govt. tax and sales tax are charged but Commission varies from market to market (Rajkot – 1.5% and Patan 1.0%).
- Some PMWs bought from CA at 740 per qtl., and sold to Pune UMWs at 1010 per qtl. They do not incur other costs or taxes in this sale transaction. PMWs do not incur any cost on sales transaction. In some cases, when they sell to atta chakki no costs or taxes are incurred.
- In some cases, there is no commission or taxes since no CA are operating and PMWs buy directly from farmers. They operate on price differentials, and other costs are charged to buyers. Price difference implicitly covers the commission. Since they are no licensed CAs, there is on reporting of the exact figures of charge. Often since, they deal directly with farmers, they are put in CA category.
- In many M.P and U.P markets and there are no licensed CAs. Operation is on direct price differential.
- Reliable information on credit and storage cost was not available.
- It is important to taker care of the double counting of commission and taxes, since commission and taxes are payable only once by one of the chain members, but they are often mentioned by both.

References

Bhalla, G.S., Hazell, P. and Kerr, J. 1999, 'Prospects for India's cereal supply and demand to 2020', *Food, Agriculture and Environment: Discussion Paper No. 29*, IFPRI, Washington, DC.

Byerlee, D. and Traxler, G. 1995, 'National and international wheat improvement research in the post-Green Revolution period: Evolution and impact', *American Journal of Agricultural Economics*, May, pp. 268-278.

Fertiliser Association of India 1999 to 2003, *Fertiliser Statistics,* New Delhi.

Food Corporation of India (FCI) 2004, Annual Report, New Delhi.

Gandhi, Vasant P., Zhang-yue Zhou and John Mullen, "Wheat Economy of India: Will Demand be a Constraint or Supply?" Economic and Political Weekly, 39(43) October 23, 2004.

Gandhi, Vasant P. 1997, 'Technology, cost reduction, and returns in agriculture: A study of wheat and rice in Punjab, *Vikalpa: The Journal of Decision Makers*, Vol. 22, No. 2, Indian Institute of Management, Ahmedabad, April-June, pp. 35-48.

Gandhi, Vasant P. and Koshy, Abraham. "Can targeting work in food security programmes? A study of consumer behaviour and the fair price shop system for food in India", Contributed paper presented at the IAAE's XXIII International Conference of Agricultural Economists, at Sacramento, California, USA, August 10-16, 1997.

Ghosh, Madhusudhan 2003

India, Commission for Agricultural Costs and Prices 1997 to 2001 *Reports of the Commission for Agricultural Costs and Price for the Crops Sown during various Season*, Ministry of Agriculture, New Delhi.

India, Directorate of Economics and Statistics 1999, 2002, 2005 *Agricultural Statistics at a Glance,* Ministry of Agriculture, New Delhi.

Jha, Raghavendra 1997

Johansen and Juselius 1990

Kainth1982

Lele, Uma 1971

Sarma, J.S. and Gandhi, V. P. 1990, 'Production and consumption of foodgrains in India: Implications of accelerated economic growth and poverty alleviation', *IFPRI Research Report No.81*, Washington, DC.

Sidhu, D.S. and Byerlee, D. 1991, 'Technical change and wheat productivity in post-Green Revolution Punjab', *Economic and Political Weekly*, December 28.

Sidhu, D.S. and Byerlee, D. 1992, 'Technical change and wheat production in the Indian Punjab in the Post-Green Revolution period", *CIMMYT Economic Working Paper*, 92-02, Mexico, DF.

Sims, H. 1988, Political Regimes, Public Policy, and Economic Development: Agricultural Performance and Rural Change in two Punjabs, Sage Publications, New Delhi.

Subbarao1978

www.mapsofindia.com 2005.