THE SPATIAL INTEGRATION AND PRICING EFFICIENCY OF THE PRIVATE SECTOR GRAIN TRADE IN BANGLADESH : PHASE II REPORT

by

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EXECUTIVE SUMMARY

This report describes the principal findings of Phase II of the BIDS-BSERT-IDS project into the private sector grain trade in Bangladesh. The objectives of this project were to investigate the spatial integration and pricing efficiency of the private-sector grain trade and how it has changed since grain markets were liberalised in 1992, together with the problems and constraints faced by rice and wheat wholesalers.

Phase II of the project investigated the paddy-rice marketing chain in three procurement areas (Dinajpur, Naogaon, and Sherpur) and two terminal markets (Chittagong and Dhaka) using a structure conduct performance approach. Evidence of the shortening of marketing chains was uncovered, with market linkages contracting both vertically and spatially. Farmers were found to deliver more paddy directly to millers, while paddy wholesalers were taking over the activities of small scale paddy traders. In addition, millers and wholesalers in the procurement areas were bypassing traditional marketing intermediaries and selling directly to wholesalers in the terminal markets. Mills in the terminal markets, in particular those serving high quality *niche* markets, were also found to procure paddy direct from the procurement regions, with some selling rice on direct to large retailers.

This shortening of marketing chains has been accompanied by changes in the pattern of trade credit advanced between different tiers of the marketing chain. There appears to be increasing circularity in trade credit together with a net flow of funds to millers. However, the relatively high numbers of new entrants into most tiers of the marketing-chain indicated that barriers to entry are quite low.

Traders stated problems and constraints varied according to the tier of the paddy-marketing chain in which they operated. Traders operating toward the lower end of the chain, such as paddy wholesalers and millers, were most concerned with lack of institutional credit facilities and reduced levels of government procurement in recent years. But further up the marketing chain, transport related problems became of greater concern, particularly to millers and rice wholesalers in the terminal markets.

Rice retailers were most concerned about the increasing level of competition in recent years, which has been forcing them to make more credit sales to final consumers.

Since wheat imports were opened up to the private sector trade in 1992, Bangladesh's wheat markets have become increasingly segmented and driven by end-users requirements. Private sector importers have concentrated on bulk imports suitable for the production of white flour for urban consumers. This segment of the wheat market is becoming increasingly dominated by major flour mills and the few traders who can afford to make bulk shipments. Meanwhile, rising domestic production and imports of small consignments of lower quality wheat from India has contributed to a growth in coarse flour (*atta*) production. While oligopolistic tendencies at the high quality end of the market deserve careful monitoring, more space might be opened up for the private sector procurement/imports at the lower end of the wheat market.

The overall picture that emerges is one of a dynamic and well-functioning marketing system. As such the primary policy implication of this study is that Government, donors, NGOs and other agencies should seek to find way of reinforcing the inherent strengths of the private sector marketing dynamic rather than trying to compete with it. Our enquiries indicate three areas in which government intervention may be especially beneficial to the private sector grain trade: road transportation, inventory credit, and the stability of the trading environment. It is recommended that an inventory credit scheme targeted at millers be investigated, and a forum for the regular assessment of the national food situation and co-ordination of food imports involving private sector traders be established.

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GLOSSARY

Aman	Rice planted during July and harvested in November
Arat	Fixed premises from where *Aratdars* operate
Aratdar	Paddy/rice wholesalers with fixed premises
Atap	Non-parboiled rice
Atta	Coarse wheat flour with a high percentage of bran
Aus	Rice planted during April and harvested in July
Bepari	Independent paddy or rice trader
Boro	Rice planted during December and harvested in May
Chandabaz	Touts who collect illegal tolls from traders
Chalan	Consignment
Chatal	Paddy drying floor
Faria	Very small scale itinerant paddy trader
Ghat	River port
Sadar	Administrative headquarters
Thana	Administrative unit below the district level

ABBREVIATIONS

PFDS	Public Foodgrain Distribution System
Tk.	Taka (Bangladeshi currency)
SSC	Secondary School Certificate
HSC	Higher Secondary Certificate
DAM	Department of Agricultural Marketing
EEP	Export Enhancement Programme

FOREWORD

This report describes the principal findings of Phase II of the BIDS-BSERT-IDS project entitled "The Spatial Integration and Pricing Efficiency of the Private-Sector Grain Trade in Bangladesh".* This 18 month study was carried out between November 1996 and April 1998 by the staff of three institutions: the Bangladesh Institute of Development Studies (BIDS), the Bureau of Socio-Economic Research and Training (BSERT) at the Bangladesh Agricultural University, and the Institute of Development Studies (IDS) at the University of Sussex. Valuable inputs into the study were also made by the Food Policy Monitoring Unit (FPMU) and the Department of Agricultural Marketing (DAM). The project was funded by the British Department for International Development's Renewable Natural Resources Research Strategy's Crop-Post Harvest Research Programme.

Senior authorship of this report is not assigned. Nonetheless, it is appropriate to indicate the division of responsibilities in the production of the various chapters of this report and the underlying research activities. The analytical framework in Chapter 2 was designed by Dr Sajjad Zohir of BIDS in close association with Dr Bob Baulch of IDS, the project manager, and Professor W.M. H. Jaim of BSERT. The investigation of rice marketing in the procurement areas in Chapter 3 was conducted by a BSERT team led by Professor W.M.H. Jaim, who also conducted the statistical tabulations and write-up for this chapter. The investigation of rice marketing in the terminal markets was supervised by Jayanta Das of IDS who also conducted the statistical tabulations and write-up for the bulk of Chapter 4. However, the pricing analysis at the end of both this chapter and Chapter 3 is the work of Dr Zohir. Dr Baulch and Dr Zohir jointly wrote Chapter 5 on putting the paddy rice marketing chain together, while Naser Farid of the Food Policy Monitoring Unit and Dr Zohir wrote Chapter 6 on wheat. Dr Baulch made additional inputs to the pricing analysis, edited and put together the final report with the secretarial assistance of Jenny Edwards of IDS. The authors are indebted to Mrs Shahanaz Begum of the Department of Agricultural Marketing, and Professor Sudin Mukhopadhyay of INSPARC at the University of Kalyani (West Bengal) for collaboration on assembling, cleaning and interpreting the price data used in this report.

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CHAPTER 1: INTRODUCTION TO THE STUDY

In recent years, many developing countries have adopted policies to liberalise their grain markets. Amongst the South Asian countries, Bangladesh has undertaken some of the most extensive reforms, by both rationalising the extent of public sector procurement and distribution, and opening rice and wheat imports up to the private sector in 1992 (Ahmed, 1996). With the removal of other impediments to trade (trading licences, anti-hoarding laws) and improvements in the nation's road and telecommunications infrastructure, the conditions for a transformation of the private sector grain trade were created.

A key pre-requisite for producers and consumers to benefit from the improved market efficiency that grain market liberalisation is meant to bring, is the ability of the private sector grain trade to transmit price signals over time and space. Spatial market integration, which ensures that prices in geographically separated markets differ by no more than transportation, handling and other transfer costs, is one key aspect of such price transmission. Pricing efficiency, which ensures that prices in one market reflect the available price information in other markets, is another. Accordingly, this project investigated the spatial integration and pricing efficiency of the private sector grain trade in Bangladesh, and how it has changed in recent years.

Specifically the objectives of this 18 month project were:

- To inform policy makers concerning the spatial integration and pricing efficiency of the private sector grain trade in Bangladesh, and how it has changed since the grain market was liberalised in 1992; and

- To identify and build consensus around the most effective policies to address the problems and constraints faced by rice and wheat traders.

In Phase I of the project, the long distance wholesale grain trade was investigated. Secondary wholesale prices of the most commonly traded varieties of rice and wheat together with primary data on transportation, handling and other transfers costs were used to assess the extent of spatial market integration and pricing efficiency using a variety of complementary time series techniques. Between January and March 1997, a semi-structured questionnaire survey of 106 traders in 14 of Bangladesh's principal wholesale markets was conducted to collect information on rice and wheat wholesalers' transfer costs and the principal problems and constraints faced by them. The main conclusions emerging from the Phase I study were that Bangladesh's rice and wheat markets have become more spatially integrated since 1992, and that transport related difficulties were wholesalers' main problem, followed by depressed market conditions and lack of credit. Evidence was also found of an increase in the direct marketing of rice coupled with a shift in relative market power away from the traditional central markets in old Dhaka. For further details, interested readers are referred to the Phase I reports by Das, Zohir and Baulch (1997) and Jaim, Baulch and Sabur (1997).

While Phase I of the project was dominated by examining spatial marketing integration and pricing efficiency at the wholesale level, Phase II has focused on trying to understand the paddy-rice marketing chain in more detail in a number of selected locations. Originally, Phase II had intended to focus on the paddy-rice marketing system within two rice surplus and two rice deficit areas. However, the results of the Phase I study indicated that this would be unlikely to capture many of the interesting spatial developments in the marketing chain. Phase I had identified three areas to dominant domestic rice supply to the nodal markets in the national marketing chain: Dinajpur and Naogaon in North-west Bangladesh and Sherpur in Northern Bangladesh. Grain markets in each of these areas appeared to have evolved in different ways, which had implications for the future development of the national paddy-rice marketing chain. Similarly, further exploration of the key terminal markets of Dhaka and Chittagong seemed important if both the demand-end of the chain and the decline in the relative market power of traditional wholesaling centres was to be understood. For these reasons, it was decided to concentrate on these three procurement areas and two terminal markets in the Phase II study. Fieldwork in these locations was conducted during October and November 1997.

Another contrast between the two phases of the project, is that Phase II has involved a much higher degree of investigative fieldwork, much of it of a qualitative rather than quantitative nature. This was in part dictated by the absence of good, consistent and complete price data below the wholesale level, which has prevented the pricing analysis conducted in Phase I being repeated at lower levels of the marketing chain. Retail price data was also found to be lacking in all but a few locations. But it was also appreciated that pricing analysis would not be able to uncover all the complexities of real markets at these levels. Since markets are embedded in wider networks of commercial contracts and obligations, it was felt to be important to study not just price relations and commodity flows between traders, but also how forms of contracts act to regularise certain types of transactions. To capture the dynamic process of market development, we have also sought to discover how traders had established, expanded and diversified their businesses, and how spatial cum-vertical linkages and credit related considerations have affected this process. The information so gained, both allows us to contextualise our enquiries into the problems and constraints faced by traders in more detail, and to understand how policy interventions might impact on the structure of the paddy-rice marketing chain.

Specific questions to be investigated during Phase II have therefore included:

- Whether there has been a shortening of marketing chains in the rice trade;
- What is the pattern of trade credit between participants at different tiers of the marketing chain;
- Whether market linkages and patterns of trade credit vary seasonally; and
- The extent to which paddy and wholesale rice prices, and wholesale and retail rice prices are integrated in selected locations.

By comparing our findings with the results of Chowdhury's (1992) comprehensive investigation of Bangladesh rice markets, whose major fieldwork component was conducted in 1989/90, it is hoped to discover how the liberalisation of rice markets in 1992 have

affected developments in these four areas. Furthermore, by linking developments in the structure of the paddy-rice marketing chain with traders' own stated problems and constraints- -an area not investigated by Chowdhury- -it was hoped to prioritise the types of policy interventions needed to foster future development of the private sector trade.

For the wheat market a rather different approach was taken. Even at the wholesale level, Phase I had revealed an extreme dearth of price data on wheat. Furthermore, because neither wheat nor wheat flour may be regarded as homogeneous products, it was difficult to determine modal tendencies in the wheat trade from our survey of 30 wheat traders in 6 markets. Since the wheat market chain is known to have a much more concentrated spatial network than for rice, to be more reliant on imports, and to have a higher public sector presence, a key informant approach was taken to this section of the study.

Team Composition

Both phases of the study were carried out by the staff of three institutions, the Bangladesh Institute of Development Studies, the Bureau of Socio-Economic Research and Training at the Bangladesh Agricultural University, and the Institute of Development Studies at the University of Sussex. BIDS was responsible for pricing analysis during both phases of the survey. BAU was responsible for the survey of traders in the procurement areas conducted during Phase II of the project, and for the long-distance wholesalers survey conducted in Phase I of the project. IDS was responsible for the survey of traders in the terminal markets conducted in Phase II, plus the overall direction and management of the project.

The principal researchers from each of these institutions were Dr Sajjad Zohir (BIDS), Prof W.M.H. Jaim (BSERT) and Dr Bob Baulch (IDS). Jayanta Das (IDS) and M. Shainur Rahman (BSERT) worked as research officers on both phases of the project. M. Saiful Islam (BSERT) worked on the Phase I survey work, while Shajahan Mia and M. Azmal Hoque Khan (BSERT) worked on Phase II of the project. Naser Farid of the Food Policy Monitoring Unit (FPMU) was involved as a resource person throughout the project, while Dr S.A. Sabur (BSERT) and Dr M. Greeley (IDS) made occasional inputs into the project.

Although, not formally a team member, we are indebted to Mrs Shahanaz Begum of the Department of Agricultural Marketing, who worked with us on assembling price data in both Phase of the project. Prof Mukhopadyhay of the University of Kalyani, West Bengal collaborated with us in the collection and analysis of wholesale prices for West Bengal.

Limitations of and Problems Encountered with the Study

An eighteen month project with a limited budget cannot hope to cover all aspects of grain marketing in Bangladesh. Accordingly, at an early stage of the project it was decided to focus our investigations on the spatial aspects and middle stages of the marketing chain. This has meant that both farmers and consumers have not been explicitly considered by the study.

While Phase I of the study aimed to present a geographically representative picture of the wholesale marketing of rice and wheat throughout Bangladesh, Phase II concentrated on the paddy-rice marketing chain in just three procurement areas and two terminal markets. Clearly, an investigation in so few areas cannot produce a geographically representative or sufficiently diverse picture of other tiers in the marketing chain. Our intention in focusing on the main procurement areas and terminal markets was rather different: to determine the marketing patterns and structural changes that were occurring in the most dense and dynamic areas of the marketing chain. Along with the key informant approach adopted in the study of the wheat market in Phase II, these may provide valuable evidence of the directions in which the private sector grain trade will evolve elsewhere in the country.

In addition to paddy *aratdars*, millers, wholesalers and retailers, it would have been desirable to interview other marketing agents such as *farias*, different categories of *beparis* and crushers/custom millers. Since these marketing agents often do not have fixed premises, and often engage in grain marketing on a seasonal basis, it was not felt to be feasible to survey them formally during the project. However, a considerable amount of information about their activities can be gleaned both from the semi-structured questionnaire surveys that were undertaken and from discussions with key informants.

In addition, in a single visit semi-structured questionnaires of the type administered in Phase II were not felt to be feasible to go into all aspects of traders' practices. Issues connected with the volume of loans and other trade credit were felt to be especially sensitive and have therefore only been addressed in a qualitative way. The seasonality of trade flows and trade credit patterns were also found to be very complex, and while some preliminary classification of these has been conducted by dividing the agricultural years into peak (*Aman*, *Boro*) and slack (pre-*Boro*, pre-*Aman*) periods, these findings are only indicative. To investigate seasonality issues in more detail, a much more intensive longitudinal study of - -traders- - ideally involving access to their trading ledgers- -as conducted by Crow and Murshid (1994) would have been necessary.

References to the incomplete and poor quality of non-wholesale price series have already been made. However, at the wholesale level we were able- -with substantive inputs from the Department of Agricultural Marketing and Food Policy Monitoring Unit to put together a remarkable data set comprising nine years of weekly rice prices in 68 markets. Fourteen of these were analysed extensively in Phase I of the study, but there is scope for further analysis and updating of this information.

Structure of the Report

Chapter 2 of this report reviews some of the key findings from Phase I of the project, and develops a framework for analysing rice market integration that explicitly recognises the spatial-cum-vertical nature of the paddy-rice marketing chain. Chapter 3 reports on the Phase II survey of paddy *aratdars* and millers in the procurement areas, while Chapter 4 considers rice milling and marketing in the terminal markets of Dhaka and Chittagong. Each chapter contains an analysis of the alternative marketing channels, the seasonality of different traders' purchases and sales, the types of trade credit they give and receive, and their principal problems and constraints. Information is also presented on the pattern of how trading firms and some markets have developed over time. Chapter 5 pulls together the demand and supply sides of the paddy rice marketing chain, and synthesises some of the key issues concerning patterns of firm expansion, trade credit, seasonality and market participation, and the key problems and constraints faced by different tiers of traders. Finally, Chapter 6 describes a

separate analysis of the wheat marketing channels and structure based on interviews with key informants and secondary data. Using a framework that accounts explicitly for product differentiation, the implications of recent developments for the concentration of market power and the further liberalisation of the private sector wheat trade are explored.

CHAPTER 2: THE CHANGING FOODGRAIN MARKET IN BANGLADESH: AN ANALYTICAL FRAMEWORK FOR THE PHASE II STUDY

This chapter sets out the analytical framework used in Phase II of the study. To contextualise the framework and issues to be examined, we first review some of the key findings from Phase I of the study. A simple framework that incorporates the spatial-cum-vertical structure of the Bangladeshi grain trade is then developed. Using this framework, a number of critical and conceptual issues concerning the changing nature of the trade are then posed. The specific research methods used to assess these issues during Phase II are also outlined.

I. KEY FINDINGS FROM THE PHASE I STUDY

The Phase I study, whose focus was on the long-distance grain trade, revealed a number of interesting aspects of the development of the foodgrain market in Bangladesh. The following points should especially be noted:

- Wholesale rice and wheat markets were found to be spatially well-integrated, with the extent of integration improving since 1992. This improvement is partly due to grain market liberalisation, but investments in the road and telecommunications infrastructure are also important.

- There is evidence of an increase in the direct marketing of rice coupled with a shift in relative market power away from the central market of Badamtoli/Babu Bazaar in old Dhaka. Market linkages are becoming more and more diversified, both spatially, and vertically.

- The sudden liberalisation of grain markets in 1992, appears to have accentuated the volatility of rice prices. Reduced government interventions in the grain markets

combined with initially over-optimistic expectations by private sector traders appears to have led to a trade driven "cobweb-cycle" which has accentuated both the amplitude and phase of cyclical rice prices (see Appendix 2.1).

- Results of a survey of a semi-structured questionnaire survey of traders in Bangladesh's principal wholesale markets indicated that transport related difficulties were wholesalers' main problem, followed by depressed market conditions and lack of credit.

- The pure "Law of One Price" does not hold between any pair of markets, but over 80 percent of price changes are transmitted between wholesale market pairs within two weeks.

Given the above findings of the Phase I study and in line with the stated objective of our Phase II investigations, the second phase of the project has investigated the trade flows and interrelated transactions (e.g., finance) among various tiers along the vertical chain of rice marketing. Thus both the vertical as well as the spatial integration of markets, together with the implications for pricing efficiency, are the focus of Phase II of the study.

II. A SIMPLIFIED STRUCTURE FOR MARKETING CHAINS IN THE BANGLADESH GRAIN TRADE

The structure of foodgrain markets in Bangladesh has traditionally been perceived in terms of the vertical chain, with the agents in such a chain being quite well defined.[1] On the supply side, the vertical chain is perceived to include farmers, *beparis/farias*, paddy *aratdars* in assembly markets, and millers.[2] The latter have usually been perceived as the major link between agents on the supply side and agents on the demand side, which

[1] See, for example, Ahmed and Bernard (1989), Chowdhury (1992 and 1993), Crow, (1989), Crow and Murshid (1994); Farruk (1972), Islam et al. (1987), and Ravallion (1987).

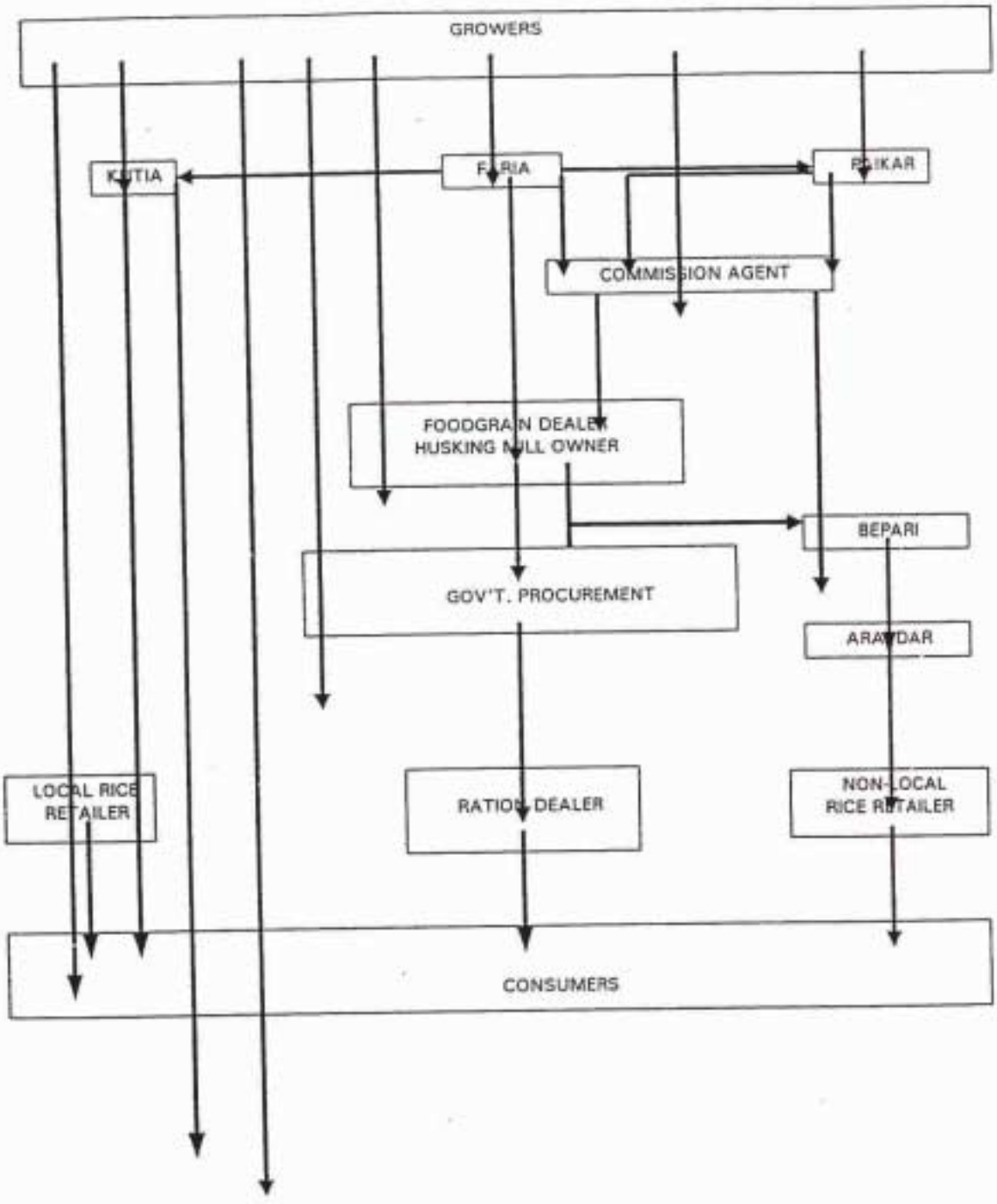
includes rice wholesalers, retailers and final consumers. The transmission of prices within such a framework has largely been perceived in terms of the marketing margins between different tiers of vertically linked agents, and how such margins may have changed both seasonally and due to supply shocks. Such vertical chains in the Bangladesh rice market are captured in Figure 2.1.

An alternative framework, which attempts to capture the vertical-cum-spatial structure of the Bangladesh rice market, is shown in Figure 2.2. This framework explicitly recognises the presence of two distinct sets of rice wholesalers and millers, who are distinguished by their locations, here described as procurement regions and terminal markets. This framework allows, albeit in a stylised way, the issue of the shortening of marketing chains to be addressed. Including this spatial dimension of the grain trade allows one to capture the structure of real grain markets in a more meaningful way.

Even though the presence of numerous agents in any tier of the rice market in Bangladesh may give the impression of "the invisible hand" of an impersonalised competitive market, the flows between any two tiers in the real market involve formal or informal contracts between parties. The exact terms and conditions of such contracts will determine the extent to which prices in one tier will deviate from the one below, and also the extent and speed at which price transmission between tiers will occur. It is to be expected that the terms and conditions of such contracts vary with time as well as with relative demand supply balance in the market. They may be also influenced by infrastructural considerations (e.g., the state of physical markets and transportation links) of one sort of another. Therefore understanding the various types of contracts in the grain trade and how they impinge upon the integration and pricing efficiency of the grain trade is essential to our Phase II study.

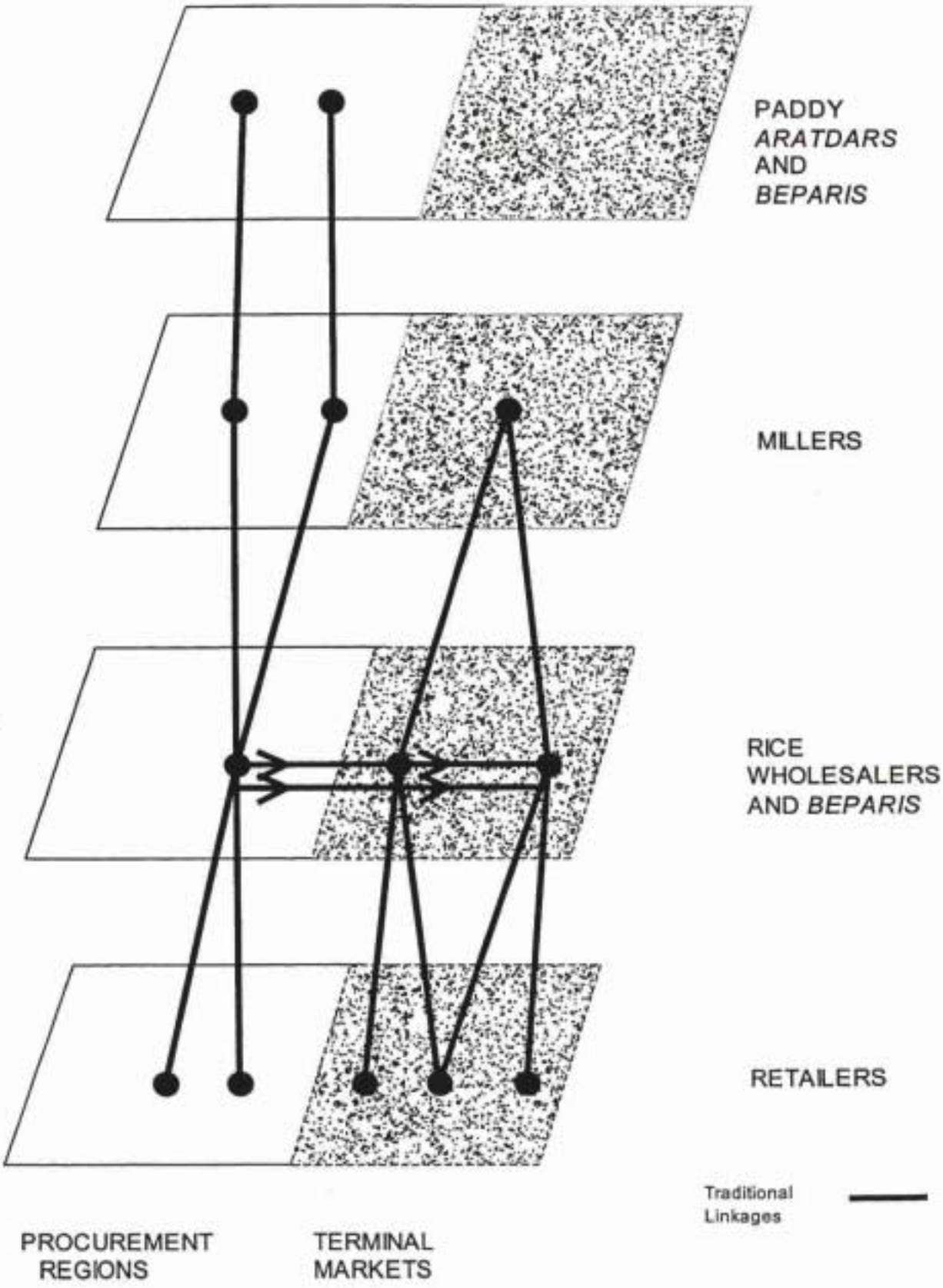
[2]See the glossary for brief descriptions of these terms.

Figure 2.1: Rice Marketing Channels in Bangladesh



Source: Grabowsky and Poort BV (1997)

Figure 2.2: A Framework for Analysing Rice Market Integration



III. THE CRITICAL ISSUES

During the course of the Phase I study, a number of issues related to the changing structure of the private-sector grain trade came to light. It was not possible to investigate many of these issues within the context of the Phase I study, but they become important starting points for our Phase II investigation. Such issues include:

- One important aspect, already noted, is the reduction in market power once held by the rice wholesalers in the central market of Badamtoli/Babu-Bazaar in old Dhaka. This has been associated with the development of a number of smaller wholesaling centres on the outskirts of Dhaka trading directly with millers and wholesalers in the procurement areas. The factors underlying the establishment of these markets, together with their impact of the paddy-rice market chain is therefore one of the issues to be investigated in Phase II of the study.

- The previous study also highlighted instances in which shortening of marketing chains within the procurement areas had occurred. It was noted that the role of independent *beparis* appear to be in decline, which is effectively an indication of shortening of chains even though it may be rooted elsewhere. One obvious question that arises is whether these phenomena are triggered by discrete changes in market conditions or a general trend arising from market development;

- The Phase I study also found indications of significant variations in contractual arrangements between marketing agents. Transactions between marketing agents on different tiers of the marketing chain involves financial ties, which may restrict competition in what appear to be otherwise atomistic and competitive marketing conditions. Credit advances may also underlie some of the lags and asymmetries in the price transmission observed during the Phase I study. However, to investigate changes in the price transmission process more fully, it is necessary to go beyond wholesalers' behaviour, and investigate how paddy and rice prices are interrelated in

procurement regions and wholesale and retail prices are interrelated in the terminal markets. To the extent that the available secondary price data allows, this analysis has been conducted as part of the Phase II study.

- Although falling outside the specific remit of the study, changes in traders' price expectations leading to changes in storage behaviour were identified as one plausible reasons for the increased volatility of cyclical price movements since 1992. While storage and stockholding behaviour relate more to temporal than spatial market integration, they are likely to have implications for the nature of contracts between various parties and thereby for the extent and speed of price transmission between the tiers of the paddy-rice marketing chain.

IV. RESEARCH METHODS USED IN THE PHASE II STUDY

In order to investigate these issues, the overall approach that has been adopted during the Phase II study has been to use a structure-conduct-performance methodology. The methods used combine semi-structured questionnaire surveys of traders with the analysis of secondary (in particular time series price) data at the different tiers of the marketing chain identified in Figure 2. Since, however, rice wholesalers were studied intensively during Phase I of the project, the Phase II study has focused on the other three tiers of the marketing chain: paddy *aratdars*, millers and rice retailers. So that issues to do with the spatial-cum-vertical integration of the paddy-rice marketing chain could be investigated in some depth, it was decided to focus on Bangladesh's three principal rice procurement regions (Dinanjpur, Naogaon and Sherpur) and two main terminal markets (Dhaka and Chittagong) in the Phase II study.

Within each of these survey areas a proportional, two stage sampling design was applied. The purpose of this sampling design was to ensure that linkages between the four different tiers of the marketing chain could be traced, while ensuring a random sample of traders were selected in each location. In the first stage of the design, a purposive sample of the most important milling clusters in each area was taken, with the number of clusters selected made proportional to the total number of mills in each area. Working back down the marketing chain (in the case of the

procurement regions) or forward (in the case of the terminal markets), the most important clusters of paddy aratdars and wholesaling/retailing centres trading with these milling clusters were then identified. In the second stage, lists of millers, paddy arats, and wholesalers/retailers trading in each of these clusters were constructed with the help of key informants (such as the Chairman or Secretaries of the relevant trader associations). A random sample of four millers, four paddy aratdars and five wholesalers/retailers were drawn from these lists. Table 2.1 summarises the number of clusters and traders selected by region according to this sampling design.

Table 2.1: Sampling Design for Mills, *Arats*, and Retailers in Phase II

Regions	No. of Milling Clusters	No. of Mills Selected	No. of *Arat* Clusters	No. of *Arats* Selected	No. of Retail Markets	No. of Retailers Selected
Dinajpur	5	20	8	32		
Naogaon	3	12	5	20		
Sherpur	2	8	3	12		
Dhaka	2	8			7	35
Chittagong	2	8			3	15
ALL	14	56	16	64	10	50

Having identified the mills, paddy arats, and wholesalers/retailers to be interviewed, their trading was then visited and a semi-structured questionnaire administered to the managers (who were also often the part owners) of these firms, wherever possible by prior arrangement. This questionnaire collected information on firms' histories, their sources of supply, and principal sales outlets. Detailed questions were also asked on the form of contracts used in the firms' transactions, their storage practices and sources of finance. Free form questions were also asked about the key factors influencing price expectations and the most important problems that the firm had experienced over the preceding three years.

The information collected during this survey work is presented in Chapters 3 and 4 of this report, for the procurement regions and terminal markets respectively. Chapter 5 then seeks to draw together various strands from the investigations conducted in both markets and investigate the issues of trade credit, storage, and the shortening of marketing chains.

In investigating the wheat trade, which is the subject of Chapter 6 of this report, a more informal approach was taken: the use of key informant interviews combined with analysis of secondary data. This difference in the methods was adopted partially due to resource constraints but also because of what Chowdhury (1993) refers to as the more concentrated spatial pattern of wheat markets in Bangladesh dominated by a few groups of large traders. In this situation, in which traders' cooperation depends on personal introductions and goodwill, it is very hard to maintain a properly representative sampling frame.

It is appreciated that the approach taken to studying both the rice and wheat trade in Phase II have certain limitations. First, and perhaps, most importantly, it has not been possible to investigate the whole range of trading practices that are prevalent throughout Bangladesh. That was simply beyond the financial resources and time available to the project, so it was decided to focus on those geographical regions which seemed to us most important to the national rice and wheat marketing chain. This is, however, perhaps a less serious problem with the wheat than the rice part of the study, due to the already noted concentrated pattern of the wheat trade. Second, it has not been possible to conduct detailed surveys of all the various intermediaries, such as *beparis*, *farias*, *kutials* and the like, involved in the marketing chain. Nonetheless a considerable amount of information relating to the roles played by these agents was gathered through our survey of paddy *aratdars*, mills, rice wholesalers and retailers. In the course of the survey work, a number of these intermediaries were also encountered and questioned informally. It has therefore been possible to contextualise their functions and importance within the context of our Phase II investigations. Finally, it should be noted that the secondary data available at the level of both paddy *aratdars* and rice retailers is much less comprehensive than at other tiers of the marketing chain. Possibly this relates to the more atomistic nature of the grain trade at these levels, but the comprehensiveness of national statistics must also be mentioned here. It was, for example, found to be almost impossible to assemble comprehensive time series of paddy prices at either the national level or in two of the three procurement regions during the course of Phase II study.

Appendix 2.1: The Cyclical Pattern of Rice Prices

During the Phase I study, it was observed that the cyclical pattern of wholesale rice prices appeared to have become more volatile in recent years. Specifically, both the amplitude and phase of national wholesale rice prices measured at monthly intervals had increased since 1992. It was suggested that this increase in price volatility might have been in response to the number of unanticipated policy changes combined with excess importation of rice by private sector traders in late1994 and early 1995.

The time that has elapsed since the opening up of the private sector trade to rice importation is still rather short, so our conclusions concerning a change in the cyclical price path must remain tentative. Nonetheless, a number of additional enquires have been conducted during Phase II which have enabled our conclusions to be investigated further. First, an additional nine months of national monthly wholesale price and import data is available (until December 1997). Second, wholesale data from three markets in West Bengal that are known to ship regularly to Bangladesh have been obtained. Finally, casual observation for which hard data is not yet available appears to confirm that the "roller coaster-ride" of Bangladeshi national rice prices has continued into the first few months of 1998.

Figure A2.1 shows the path of national monthly wholesale rice prices detrended and deaseasonalised using the multiplicative method (with 0.5 weights at the end points). It can be seen that both the amplitude (vertical distance between the troughs and peaks) and the phase (horizontal distance between troughs and peaks) have increased since 1992. This increase in the volatility of monthly wholesale prices is further born out by examining annual coefficients of variation. For national wholesale rice prices the coefficient of variation increased from around 5 percent per annum in the late 1980s to 13 percent in 1993/94 before falling back to 6 percent in 1996/97.

Figure A2.2 shows a plot of monthly coarse rice prices in Bongaon in West Bengal and Jessore. An unofficial trade in rice between these two markets is known to have existed for a number of

years, but increased in importance after rice imports were liberalised in 1992. While econometric investigations confirm that prices in these two markets are individually non-stationary, pairwise cointegrated and jointly Granger causing, it is clear that price transmission between these two markets is far from perfect. Similar results hold for two other markets in West Bengal (Behampore and Bongaon) for which we have obtained price data. While West Bengal prices did not track Bangladesh prices very closely prior to 1992, particularly wide price differentials appear to have opened up in 1994 and 1995- - the first years in which there were private sector rice imports by Bangladesh. Given the closeness of the two markets (approximately 30 kilometres), ease of transportation between them, and the elimination of Bangladesh's rice import tariff in April 1994, it is surprising the wide price differentials between Bongaon and Jessore persisted for so long.[3] One explanation is that while private sector rice imports started in April 1994, their volume did not exceed 50,000 metric tons per month until February of the following year. New entrants to the rice import business, whose previous experience was in indenting rather than the rice trade, proceeded cautiously and their low volume of imports did not have a major impact of the national foodgrain shortfall. As a consequence, wholesale price continued to rise and high profit margins in the short-term induced a second wave of new entrants into the trade at exactly the same time as the government itself started importing in earnest from overseas. With more and more government imports being distributed via open market sales, and an abundance of private sector supplies, prices plummeted and many of the late importers of rice in 1995-96 are reported to have incurred huge losses (Table A2.1).

Recent events seem to confirm that this trend in cyclical rice prices will continue into the future. During 1996/97 good *Aman* and *Boro* harvests reduced private sector importation of rice to less than 15,000 metric tons. But with more buoyant national production, public rice procurement also started to increase, while the detrended national rice price declined to pre-liberalisation levels. But a poor *Aman* harvest in 1997/98 has led to predictions of importation of over 100,000 tons in early 1998. Final figures are not available for this period, but if private and public sector

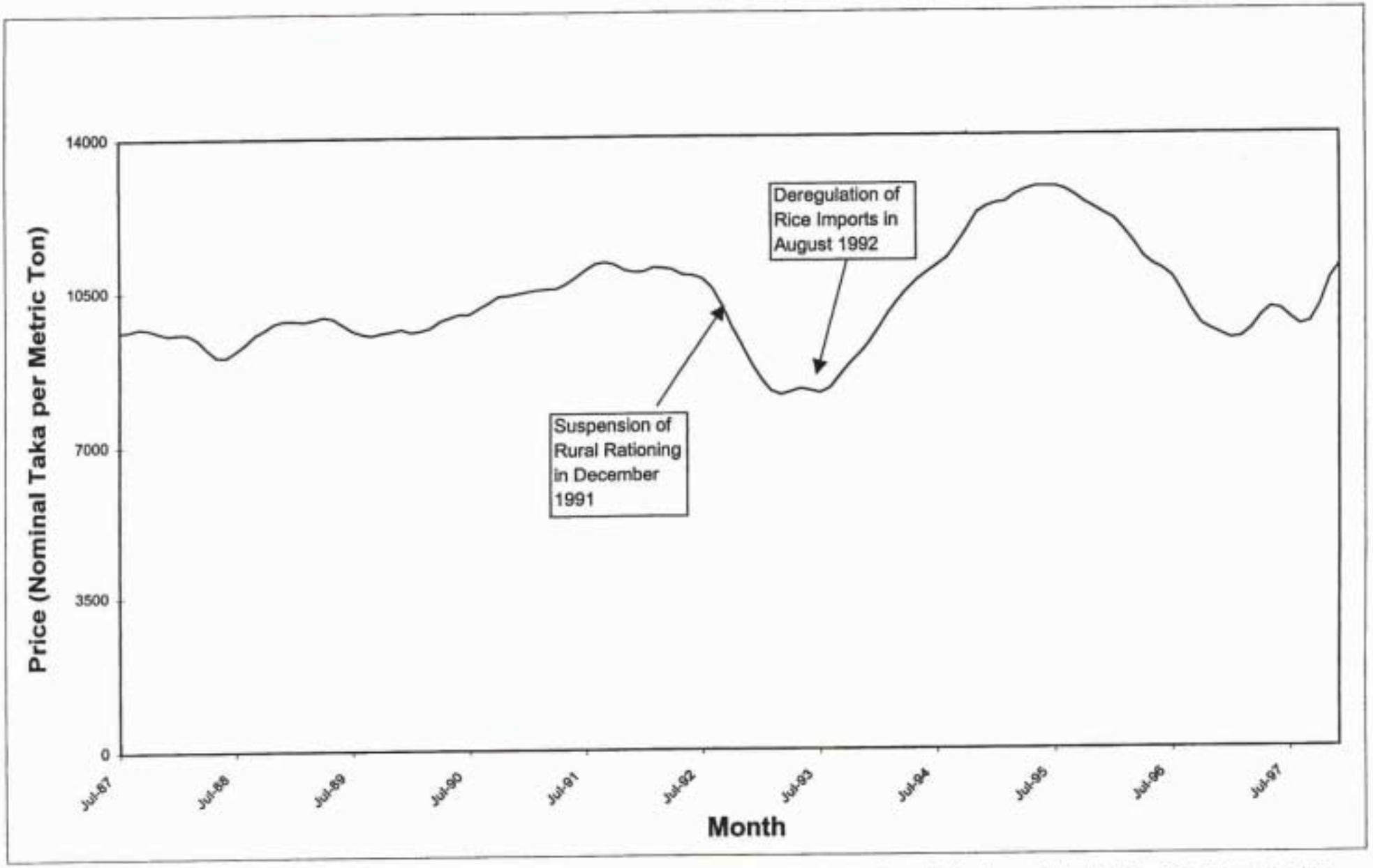
[3] Although Bangladesh has since reinstituted a tariff on rice imports, at around 3 percent of import value, this tariff is still approximately half of the tariff levied on imports of rice into India.

imports continue to be both delayed uncoordinated, it appears that the roller-coaster of prices is set to continue over the next few years.

It is possible to explain the change in the cyclical pattern or rice prices in terms of a modified cobweb cycle. In a standard Cobweb, inaccuracies in farmers' price expectations combined with lags in production response lead to increasing inter-seasonal volatility of prices. A similar process seems to have occurred in Bangladesh after 1992 with unrealistic price expectations and lags in rice importers leading to a trade driven Cobweb cycle. Lack of co-ordination between private and public sector imports, and sudden announcements of changes in PFDS procurement and release policy seem to have destabilised private sector expectations, and led to first a surge and then a contraction of their involvement in the international rice trade.

The policy implications of the increased cyclical pattern of prices are threefold. First, in order to dampen rather accentuate any trade driven Cobweb that may be developing, it is important that the Ministry of Food and other Government ministries follow consistent and pre-announced interventions. Continual unannounced changes in procurement levels and public sector imports only serve to destabilise the expectations and actions of the private sector trade. Second, ways need to be found of improving information flows and coordination between the private and public importers. These might include better monitoring and dissemination of rice imports (and prices) from Eastern India together with regular meetings at which large private sector importers can meet with Ministry of Food officials and interested donors to exchange information concerning intended import volumes and quantities and the national foodgrain demand-supply balance. Third, it should be recognised that the PFDS capacity to stabilise rice price using conventional buffer-stock policies will be reduced even if public storage capacity remains constant. Stabilisation of a more pronounced cyclical price path using buffer stocks implies the need for greater inter-annual storage, which seems to run counter to both current budgetary priorities and donors' desire to scale down Government's direct involvement in the foodgrain trade. Instead, greater attention should be paid to stabilising prices via international trade by making importation lags shorter and importation decisions more transparent.

Figure A2.1: Cyclical Movements in Monthly Rice Prices
July 1987 to December 1997



Note: This diagram shows the monthly national average rice price (OMP), detrended and deseasonalised using the multiplicative method with 0.5 weights at the end points.

Figure A2.2: Bangladesh and Indian Coarse Rice Prices

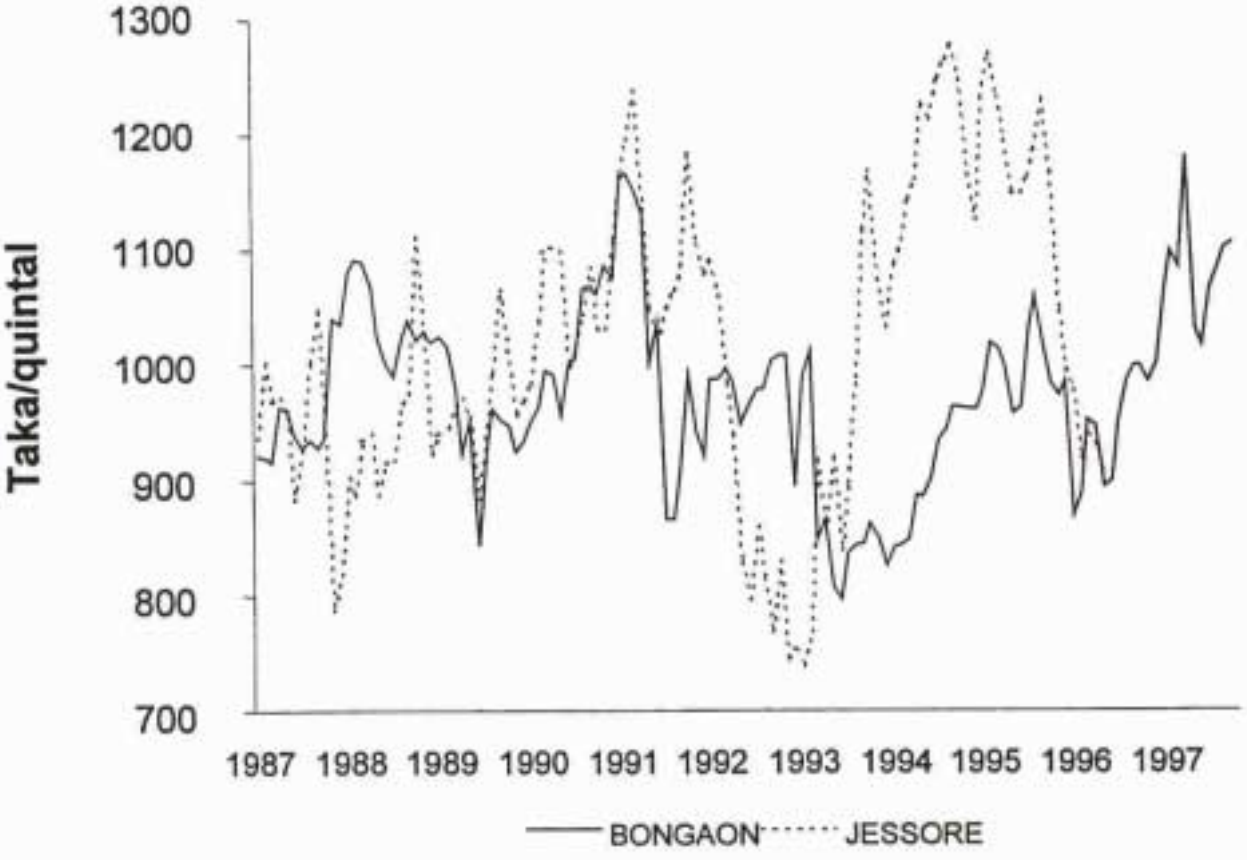


Table A2.1: Annual Production, Imports and Procurement of Rice (000's tons)

	Total Rice Production	Rice Procurement	Public Sector Imports*	Private Sector Imports
1987/88	15,414	289	582	
1988/89	15,544	359	61	
1989/90	17,856	919	300	
1990/91	17,851	727	11	
1991/92	18,252	959	39	
1992/93	18,341	227	19	
1993/94	18,050	148	-	74
1994/95	16,833	246	230	584
1995/96	17,687	330	491	650
1996/97	18,423	512	19	15

Source: FPMU

* includes food aid

CHAPTER 3: RICE MARKETING IN THE PROCUREMENT AREAS

I. INTRODUCTION

Among different agents, paddy *Aratdars*, rice millers and rice wholesalers play a significant role in the marketing chain in procurement areas. The trading practices of rice wholesalers both in procurement and terminal markets have been thoroughly investigated in Phase I of this study (Jaim, Baulch and Sabur, 1997). Therefore, in the procurement areas, the Phase II study has focused mainly on two other important marketing agents: paddy *Aratdars* (wholesalers) and rice millers. In this connection, the characteristics of *Aratdars* and millers, the market linkages between *Arats* and mills, trade credit and sources of fund for *Aratdars* and millers in the procurement areas, as well as their problems are discussed in this chapter. Further, the alternative marketing channels operating in the paddy procurement areas of Bangladesh, particularly in the private sector, are investigated.

Selection of the millers and *aratdars* in the procurement areas followed a two-stage proportional sampling design. The locations of the millers surveyed depended upon the lists of milling clusters provided by key informants, typically the Chairmen or Secretaries of the wholesale traders associations who had been interviewed in Phase I. From the lists of milling clusters, ten sample clusters were selected randomly. The number of milling clusters (five in Dinanjpur, three in Naogaon and two in Sherpur) were roughly proportional to the number of mills operating in each of the three districts.[1] On arrival in the milling clusters, a second list of the location of paddy *aratdars* with which selected milling clusters traded was made with the help of key informants. Maintaining the same sampling proportions as for the milling clusters, 16 *arat* clusters were selected randomly from the lists (eight in Dinajpur, five in Naogaon, and three in Sherpur). In each of the milling and *arat* clusters, four millers and four paddy *aratdars* were chosen randomly from lists constructed for each location. A total of 40 millers and 64 paddy *aratdars* were therefore interviewed during the Phase II fieldwork in the procurement areas. The Phase II fieldwork was conducted during October and November 1997.

Three comments should be made about the sampling design. Firstly, its aim was to capture both vertical and spatial linkages between wholesalers, mills and paddy *aratdars*. Such linkages

[1] FPMU figures indicate that there were a total of 1950 mills located in the three districts, of which 1022 were in Dinajpur, 620 in Naogaon and 308 in Sherpur.

would not necessarily have been captured if a simple random sample had been taken at each tier of the marketing chain. Second, when compiling the lists of milling and *arat* clusters, we did not confine our enquiries within existing administrative boundaries. So if the *thanas*/districts with which wholesale markets and milling clusters actually traded spilled over into other *thanas*/districts, then so did our sample. As can be seen from Appendix Tables A3.1 and A3.2, in Dinajpur and Sherpur, several of the districts in which the sampled *arats* were located were outside Dinajpur and Sherpur districts. The total number of mills and *arat* in each cluster are also shown in these tables. Third, it should be noted that all of the mills that were selected for inclusion in our sample were small scale husking mills.[2]

II. MARKETING CHAINS FOR PADDY AND RICE

There are two types of marketing chains operating in Bangladesh: one is the private sector and the other is the public sector. The roles of each category of market participants at various levels of marketing chains in private and public sectors are discussed in the following sections:

Market Participants and their Roles in the Private Sector Marketing Chain

- *Faria/Bepari*: *Farias/Beparis* are small-scale itinerant paddy traders who do not have any permanent premises in the market. They travel round the villages and purchase paddy from farmers at farm gate and sell it on to paddy *Aratdars*, local millers or to crushers. They also purchase paddy from farmers in primary markets on weekly *Hat* days and sell their purchased paddy to *Aratdars* or millers.

  In the Bangladeshi/South Asian literature on food marketing, there is a slight distinction between *Farias* and *Beparis* on the basis of scale of business operation. In that case, *Farias'* operating capital is lesser than that of *Beparis* and they are more floating traders than *Beparis*. It is generally alleged that *Farias* usually cheat the farmers by using faulty measuring instrument and providing false information about market price. They are also able to keep margin even selling and purchasing at the same price by using faulty measuring instruments. On the other hand, *Beparis* are usually attached to particular *Arats* or mills and they usually use *Aratdar* and millers' capital for doing their business. Sometimes they sell paddy to the *Aratdars* and millers at a fixed commission. However, there are also independent *Farias* or *Beparis* who are not attached with any *Arat* or mill and do their

[2] The exclusion of automatic rice mills from our sample was not deliberate, and simply reflects their low incidence throughout Bangladesh.

business independently. For simplicity we have used the terms *Faria/Bepari* to mean the same type of market intermediary.

- Paddy *Aratdars*: Paddy *Aratdars* have trading premises and generally have a larger volume of trade than *Farias/Beparis*. They purchase paddy either directly from the farmers or from *Farias/Beparis* in the village/primary markets, particularly on the weekly *Hat* days. Sometimes *Aratdars'* agents, generally salaried persons, go to the village and purchase paddy on behalf of him at the farm gate. Large farmers sometimes deposit their paddy at *Aratdar's* premises on the condition that *Aratdar* will pay them later at the price prevailing on the day of sale[3].

- *Aratdars* generally sell paddy to the local millers who usually place order to them. After receiving order from millers they generally start purchasing paddy. *Aratdars* usually sale to the millers at a fixed commission. Sometimes distant/terminal market millers purchase paddy from the *Aratdars* through contacting by their agents or over telephone. The large *Aratdars* who have good linkages with different millers also purchase paddy from the small *Aratdars* of the same market.

- *Kutials*: Small scale village level paddy processors are called *Kutials*. Marginal farmers, poor *rickshaw* drivers and unemployed people are involved in this type of business. They purchase paddy directly from the farmers either at the farm gate or in the primary markets and sell rice in the local rice wholesalers after parboiling, drying and milling of paddy by their own initiatives. They usually use family labours in parboiling and drying of paddy at their own home premises.

- Millers: Millers are, perhaps, the most important marketing agents. They are involved in processing paddy at their mills that may be owned or rented. They generally procure paddy from the *Aratdars* in the procurement area. Millers contact the *Aratdars* through their agents or over the telephone for purchasing paddy. Their agents also go to the local market and procure paddy directly from the farmers on the weekly *Hat* days. Sometimes they buy paddy either from the *Farias*/Bepris or directly from the farmers at the mill gate. Millers always try to avoid paddy collection through *Farias* because their supplied paddy is not good in quality as they usually mix different varieties of paddy.

  Some large farmers keep paddy at millers' warehouse with the understanding that the millers will process their paddy and pay him after sale of rice at a price prevailing on the day of sale. The

[3] *Farias/Beparis* may also deposit paddy at *Aratdars'* premises. However, no such cases were encountered in our field survey.

millers of course charge processing cost as well as his commission. The farmers are allowed to receive rice from the millers for their home consumption whenever needed but the value of this amount is deducted when final payment is made to the farmers.

The millers sell their rice either directly or through brokers to local or terminal market wholesalers. They show sample to the local wholesalers and if they agree to purchase at a particular price, rice is supplied to them. They also sell rice to the distant market wholesalers whenever they receive order from them either through their agents or over telephone.

- Crushers: A group of traders, popularly known as the *"Crushing Party"*, who do not possess any mill but process paddy at others' mill. Crushers are somewhat larger scale processors than *kutials*. They purchase paddy either from the farmers or from *Farias* and after processing (which includes parboiling, drying, milling, etc.) their paddy in others' mills they sell the rice in local wholesale markets.

- Brokers: Brokers (*Dalals*) are pure commission agents operating between millers and rice wholesalers. In Dinajpur area, brokers sell millers' rice to the local wholesalers at a fixed commission and in some places there are broker houses.

  In Sherpur, brokers help millers to sell rice in the distant market wholesalers whose agents come to Sherpur for purchasing rice. They charge commission either from one party or from both the parties. The activities of brokers in Sherpur temporarily ceased by the stern action taken by the millers' association. They decided that membership of millers' association would be cancelled if any miller sold rice through brokers. However, our repeat survey at the beginning of December 1997 revealed that the millers could not remain strict to their decision and the activities of the brokers in Sherpur have started again.

- Rice Wholesalers: Like paddy *Aratdars*, rice wholesalers have fixed establishment in the local or terminal markets. They collect rice from different traders, particularly from millers. Local wholesalers mainly sell rice to the distant wholesalers in the terminal markets and the wholesalers in the terminal markets ultimately sell the rice to the retailers. They also act as a commission agent and charge fixed commission by selling other party's rice.

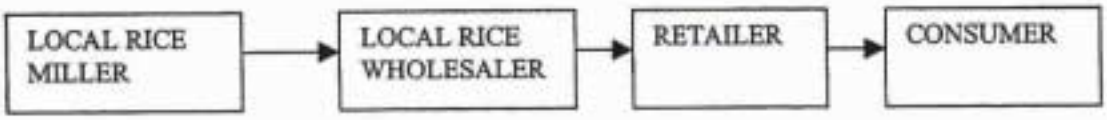
- Retailers: Retailers, having fixed shops in the retail market, purchase rice from the wholesalers and sell directly to the consumers. Some retailers in the local market purchase rice from *Kutials*.

- Rice Importers: Since 1992 private sector traders have been allowed to import rice from abroad. This has added a new dimension in the private sector foodgrain trade in Bangladesh. Independent importers as well as large rice wholesalers usually import rice when they expect a shortfall in domestic rice production. The importers sell rice to the wholesalers who then sell it to retailers for the ultimate consumers. As noted in the Appendix to Chapter 2, many rice importers are located in markets close to the border with West Bengal, such as Darshna, Jessore and Hilli. Prior to 1992, many of these importers specialised in indenting rather than the rice trade.

Alternative Marketing Channels in the Procurement Areas

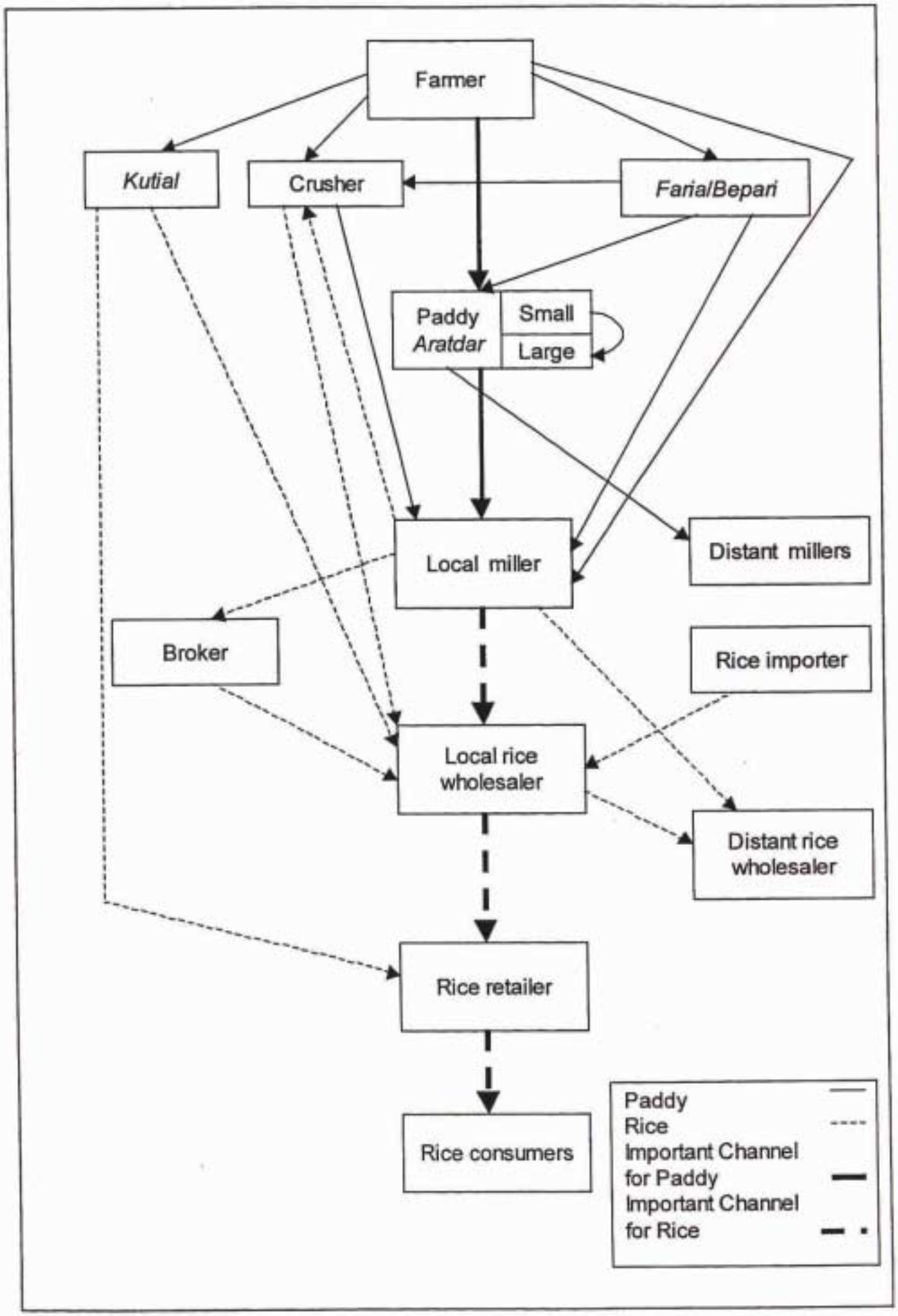
Alternative marketing channels in the private sector for paddy and rice in the procurement areas of Bangladesh can be seen from Figure 3.1. It shows that the most important marketing chain for paddy is:

and for rice is:

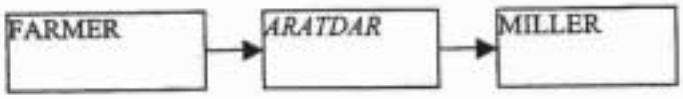


However, there are other, less important, alternative marketing chains operating in the procurement areas. It can be observed from Figure 3.1 that although vertical linkages are predominant in the marketing chain, there are instances of spatial linkages among the market intermediaries for both paddy and rice. For example, paddy *Aratdars* in the procurement areas are linked directly with rice millers in distant areas. Furthermore, wholesalers as well as rice millers in the procurement areas have spatial links with the long-distance rice wholesalers (Figure 3.1).

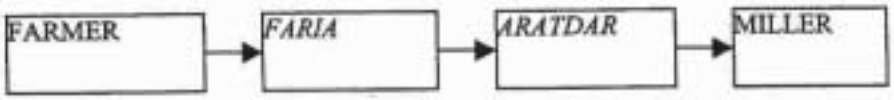
Figure 3.1: Alternative Private Sector Marketing Channels in the Procurement Areas



Variations in the marketing chain were also found at different locations of procurement areas. For example, in Dinajpur and Naogaon, the most common marketing chain for paddy in the private sector was:



while in Sherpur it was :



In Sherpur, farmers generally sell their paddy through *Farias*. In contrast, selling paddy directly to the *Aratdars* is the common practice of the farmers in Dinajpur and Naogaon.

Farmers in Dinajpur were also found to sell more paddy directly to the millers than in other districts. In Naogaon, however, during the harvesting period some large farmers deposit their paddy in millers' warehouses on the understanding that they will be paid its prevailing value when the paddy is sold at the end of the season. Smaller *Aratdars* in Naogaon were found to sell paddy to the large *Aratdars* within the same market. Although crushers were found in all the areas, they were most active in the Sherpur and Dinajpur areas.

The absence of a rice wholesale market is an important characteristic of Sherpur market. Sherpur millers sell rice directly to wholesalers in distant markets usually through brokers. On the other hand, the millers of Dinajpur and Naogaon depend on local wholesalers for selling their rice. In these places, sometimes brokers were found to operate between millers and local wholesalers. Some outside millers (from neighbouring *Thanas*/districts) also often use brokers to sell their rice to the wholesalers of Dinajpur. The rice wholesalers in the procurement areas sells rice to the local retailers or send it to the distant market rice wholesalers. The wholesalers again sell rice to retailers and the retailers ultimately sell to consumers. There are also some other less important alternative chains operating in the private sector which can be seen in Figure 3.1.

In most of the areas in the procurement areas, the marketing chain has been shortened due to the declining role of *Farias* in the marketing chain. More and more farmers now sell their paddy directly to the *Aratdars* and millers. *Farias* are bypassed for the following reasons:

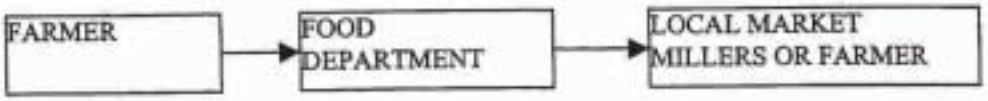
- Improvement of road communication in the rural areas.
- Farmers realise that *Farias* always cheat them in various ways.
- More *Arat* centres have been established even in the remote rural areas.
- Millers avoid purchasing through *Farias* as the quality of paddy supplied by them is not as good as from *aratdars*. *Farias* often mix different varieties of paddy in a single consignment.
- In the border areas, many *Farias* are now involved in more profitable illegal businesses such as smuggling.

Market Participants and Their Roles in The Public Sector Marketing Chain

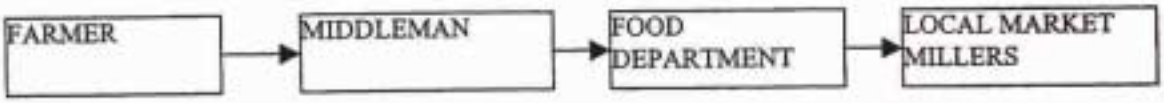
The marketing chain in the public sector involves the procurement of paddy from the farmers, processing it in private mills, storage in public sector warehouses, and distributing rice to consumers under the Public Foodgrain Distribution System (PFDS). In order to procure paddy from the farmers, the Government of Bangladesh issues quota cards through the Department of Food to the farmers. On the basis of land allocated for growing paddy, farmers get quotas that allow them to sell a specific quantity of paddy to the local PFDS procurement centre at a fixed price, which is normally higher than the market price announced by the Government.

In reality, farmers are often unable to sell their paddy to the PFDS as government officials intentionally reject farmers' paddy to serve their own financial interests as well as the interests of the local *touts*. The procurement officers usually reject farmers' paddy on the grounds that it contains a higher proportion of moisture and foreign materials. As a result, farmers are forced to sell their paddy along with their quota cards to the local *touts* called the middlemen of the Food Department at a much lower price. In some cases, farmers sell cards to the middlemen and sell paddy in the local market at the prevailing market price. The middlemen, after collecting paddy/cards from the farmers, then supply paddy to the procurement centres and take advantage of the higher price announced by the government. It should be mentioned that these middlemen are mostly *Farias/Beparis*. Since the Government of Bangladesh has drastically reduced paddy procurement in recent years, the activities of these *Farias/Beparis* have also been curtailed. This has, in turn, contributed to shortening of marketing chains in the procurement areas.

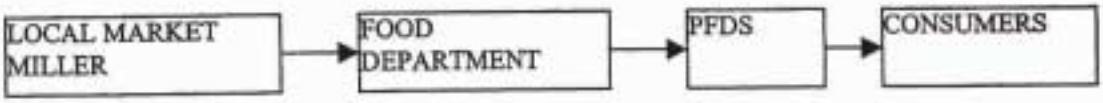
The Food Department contracts private mills to process the paddy it procures and after processing, the millers send the rice to the government warehouses. The Food Department then supplies the rice to the consumers through the PFDS. In the public sector, the marketing chain for paddy is either:



or



For rice, the chain is:



III. RELATIVE IMPORTANCE OF INTERMEDIARIES INVOLVED IN THE PRIVATE SECTOR MARKETING CHAIN

Importance of Intermediaries in Supplying Paddy to *Aratdars* and Millers

The relative importance of the intermediaries involved in the private sector marketing chain has been examined in terms of volume of paddy and rice traded taking into account seasonal variations of the trade. *Aman* and *Boro* are the two main rice crops in Bangladesh[4] and the peak periods of trading occur in the two to three months just after harvesting of these crops. The lean periods on the other hand, are two to three months before harvesting. What follows the peak trading periods of paddy/rice have been named as the *Aman* harvest and *Boro* harvests while the lean periods have been described as the Pre-*Aman* and Pre-*Boro* seasons.

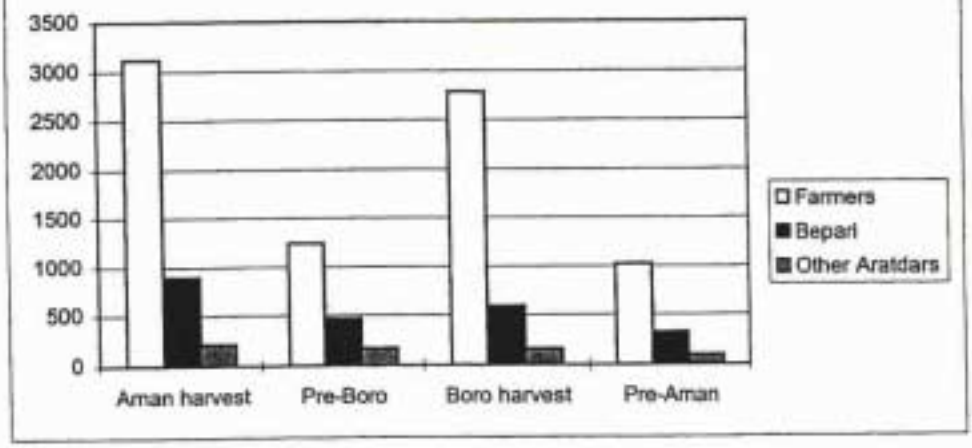
The agents involved in supplying paddy to millers are farmers, *Beparis* and *Aratdars*. In addition to farmers and *Beparis*, large *Aratdars* sometimes get supplies of paddy from other small *Aratdars*.

[4] The production as well as trading periods for the third rice crop, *Aus* (which accounts for less than 10 percent of annual total production) largely overlap with the end of the *Boro* period.

However, the analysis showed that farmers were the main suppliers of paddy for *Aratdars*. Farmers alone supplied about three-fourth (74 percent) of total paddy to the *Aratdars* while *Beparis* supplied 20 percent and the other *Aratdars* supplied only 6 percent (Figure 3.2). Seasonal dimensions of involvement of the agents involved in paddy supply to the *Aratdars* can be also seen in Figure 3.2. It clearly showed the dominance of farmers throughout the whole year in the paddy marketing chain that extended up to *Aratdars*. It also showed that the volume of business in the *Aman* and *Boro* harvesting periods were more than those of Pre-*Boro* and Pre-*Aman* periods but the relative importance of the intermediaries involved in the marketing chain maintained almost the same trend.

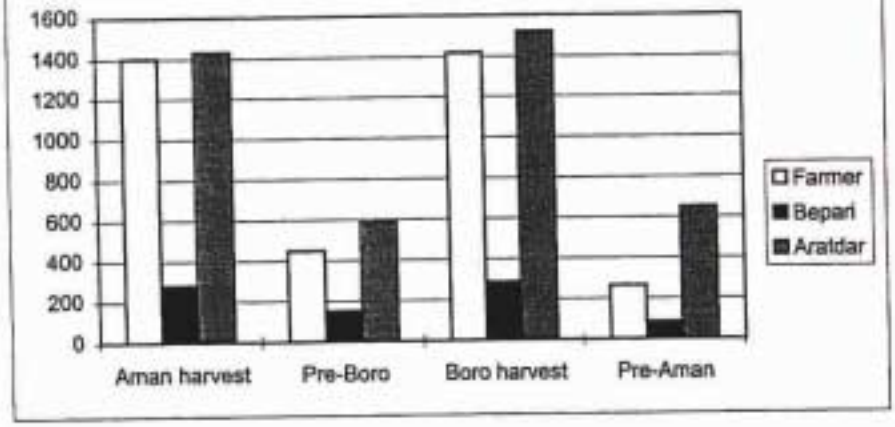
The importance of the intermediaries in the paddy marketing chain that extended up to millers was found to be somewhat different. In this case, *Aratdars* supplied about half (49 percent) of the total paddy to the millers (Figure 3.3) and the farmers' position was very close to the *Aratdars* (42 percent) while *Beparis* position was not very prominent who supplied only 9 percent paddy. Seasonal variations in paddy procurement by the millers from different agents showed that during *Aman* and *Boro* harvest periods, paddy procurements from farmers and *Aratdars* were almost the same, however, during Pre-*Boro* and pre-*Aman* periods the procurements from *Aratdars* were more than those of farmers (Figure 3.3). This indicates that in the paddy marketing chain, which involved millers, the importance of the *Aratdars* is slightly more than that of farmers.

Figure 3.2 Paddy procurement by Aratdars from different agents by seasons (in 100 Kg.)



Source: Phase II *aratdars* survey

Figure 3.3 Paddy procurement by the millers from different agents by seasons (in 100 Kg.)

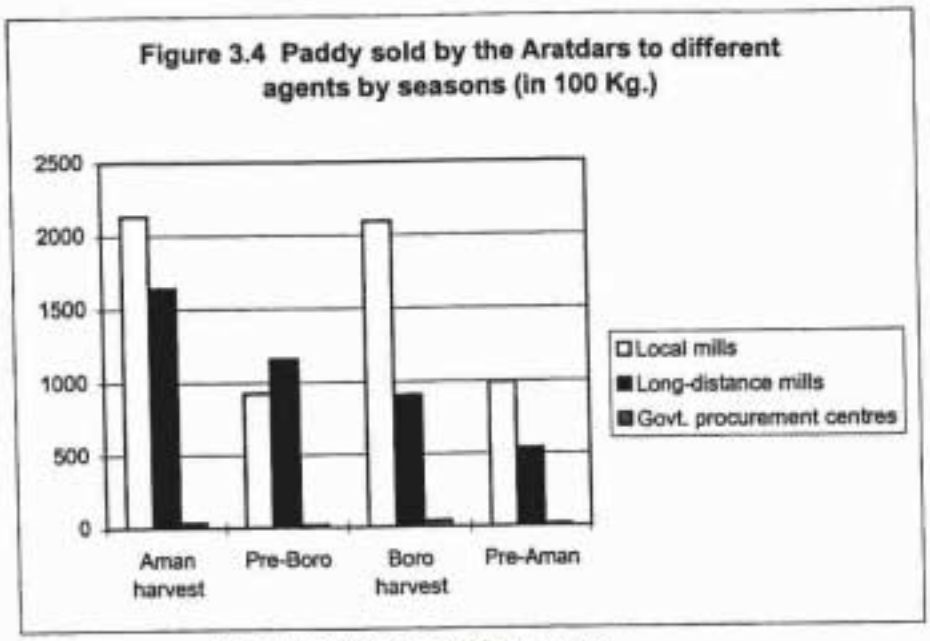


Source: Phase II millers survey, 1997

Besides procurement of paddy by own initiatives, the millers are also involved in custom milling for processing both crushers' paddy as well as paddy procured by the government. Millers are mainly involved in custom milling during pre-*Aman* and pre-*Boro* periods when there is shortage of paddy supply both from farmers and *Aratdars*. In the *Aman* and *Boro* harvest periods, the percentage of custom milling to total paddy husked was only about 5 percent, but in the pre-*Boro* and pre-*Aman* periods, the percentages were 18 and 20 respectively. Again, out of total paddy husked under custom milling, the private crushers supplied 70 percent while government supplied rest 30 percent of paddy to the millers. Therefore, in this channel private crushers played more important role than the government.

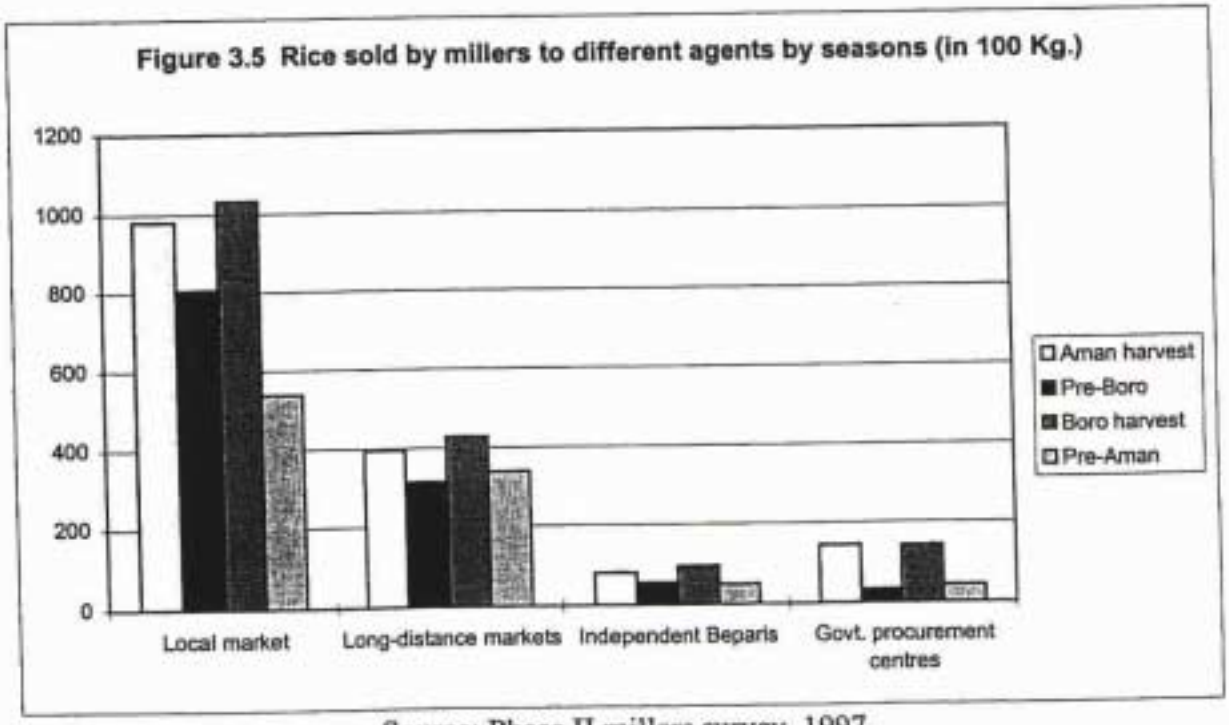
Importance of Intermediaries in Purchasing Paddy from *Aratdars* and Rice from Millers

The survey findings showed that *Aratdars* sold almost entire amount of paddy (99 percent) to the millers (only 1 percent was supplied to the Government procurement centres). Local millers were found to be the main customers of *Aratdars* who purchased about 59 percent of the total paddy while the long-distance millers bought 40 percent. However, there were significant seasonal variations in paddy sale to the local and long-distance rice millers as can be seen from Figure 3.4. The supply of paddy to the local mills was found to be higher than that of long-distance mills in all the seasons except pre-*Boro* period.



Source: Phase II *aratdars* survey

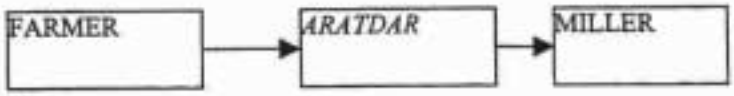
In the case of rice sale by the millers, local market rice wholesalers were found to be the main customers to whom 61 percent of total rice was sold (Figure 3.5). Further, the supply of rice to wholesalers in the long-distance markets was 27 percent while for independent rice *beparis* and government procurement centres the corresponding percentages were only 5 percent and 7 percent respectively. The supply of rice to the local wholesalers was also observed to be significantly higher than that of long-distance wholesalers throughout all the seasons (Figure 3.5).



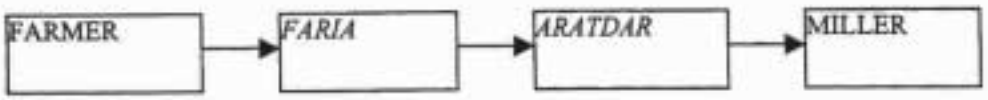
Source: Phase II millers survey, 1997

IV. MARKETING MARGINS OF INTERMEDIARIES IN THE PROCUREMENT AREAS

Marketing margins for different intermediaries in the paddy marketing chain have been estimated in two out of three procurement areas, (Naogaon and Sherpur) considering the most common channel and most common *Boro* variety traded (*Parijat* for Naogaon and *Gazi* for Sherpur) at a particular period (July, 1997).[5] The most common marketing chain for paddy in Naogaon was found to be:



while that in Sherpur was :



Then the channel extended from millers to rice wholesalers as a part of the rice marketing chain in the procurement areas.

In Sherpur, *Farias* bought paddy from farmers at a price that was Tk. 5/8 (per quintal) below the market price. This compensated his transportation and handling costs that were not borne/shared by *Aratdars* or millers. *Faria's* gross margin (difference between buying and selling prices) in Sherpur was estimated as Tk. 12.50 per quintal of paddy (Table 3.1). In the case of *Aratdars*, gross margins were estimated as Tk. 12.50 and Tk. 10.00 for Naogaon and Sherpur respectively. In this case as transportation and handling costs were borne by the millers, gross margins and net margins for *Aratdars* were the same.

[5] Since the margin related to a particular period of time, collection of data through field surveys from all the three procurement areas at that time was not possible. Therefore, data from one procurement area in the North-west (Naogaon) and one from North-central region (Sherpur) were collected.

Table 3.1: Marketing margins for *Boro* Paddy/Rice in Naogoan and Sherpur in July, 1997

(in Tk. Per quintal of paddy)

Particulars	Naogaon (*Parijat* variety)	Sherpur (*Gazi* variety)
Price paid to farmers by *Farias/Beparis*	-	537.50
Price received by *Farias* from *Aratdars*	-	550.00
Faria's gross margin	-	12.50
Price paid by *Aratdars* to the : Farmers *Farias*	575.00	 550.00
Price received by *Aratdars* from millers	587.50	560.00
Aratdar's gross margin	12.50	10.00
Aratdar's cost	0.00	0.00
Aratdar's net margin	12.50	10.00
Price paid by the miller to *Aratdars*	587.50	560.00
Price received by the millers from rice wholesalers	641.67	625.00
Miller's gross margin	54.17	65.00
Miller's transportation & handling cost	11.67	8.33
Miller's processing cost	30.00	45.00
Miller's total cost	41.67	53.33
Miller's net margin	12.50	11.67

Source: Phase II *aratdars* and millers survey, 1997

Gross margins of the millers of Naogaon and Sherpur were estimated as Tk. 54.17 and Tk. 65.00 respectively for 67 Kg. of rice (converted from one quintal of paddy). Deducting millers' transportation and handling costs (for carrying paddy from *Arats*) as well as processing cost, the net margins were calculated as Tk. 12.50 and Tk. 11.67 for Naogaon and Sherpur respectively. However, millers' processing costs in Naogaon were found to be much less, compared to that of Sherpur.

It is very difficult to say when and why millers' margins change. However, discussions with the millers surveyed revealed that their margin usually declines during the months of June and July. This is the time of year when rice prices are usually at the lowest as a result of increased *Boro* rice supply in the market at that time. On the other hand, the millers' margins go up towards the end of the season (i.e., from August to October) when the rice price increases. Again, during the time of heavy rainfall when processing of paddy by the mills declines, the rice price and the millers' margin increases.

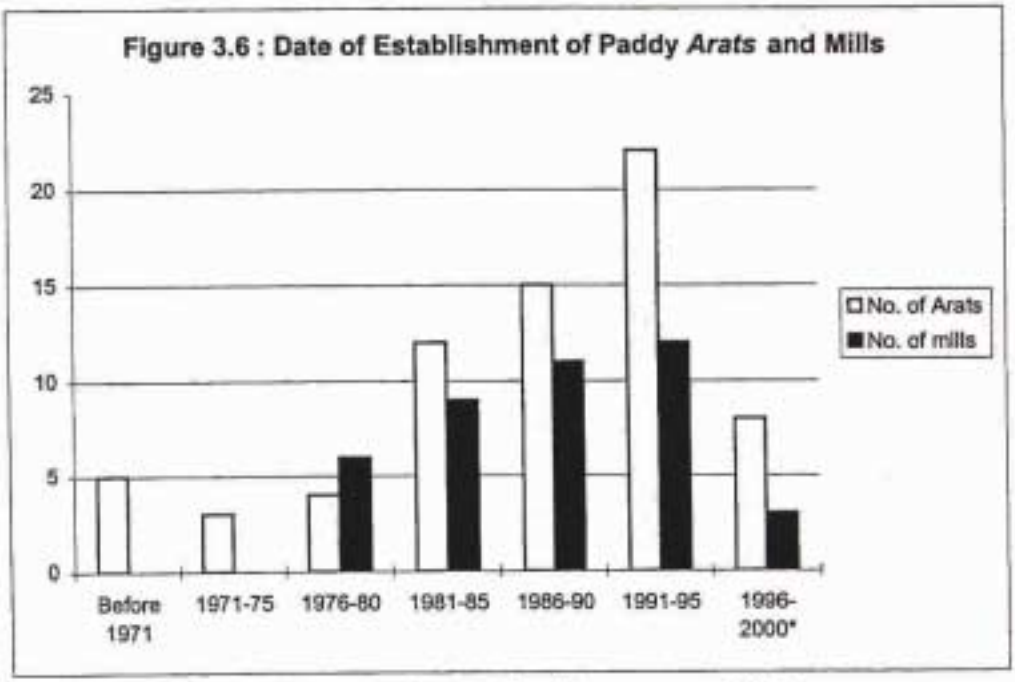
V. PADDY *ARATDARS* AND RICE MILLERS IN THE PROCUREMENT AREAS

Growth of Paddy *Arats* and Rice Mills Over Time

Survey work among the paddy *Aratdars* and rice millers in the procurement areas showed that more than 80 percent the *Arats* and mills were established after 1980. During the period from 1981 to 1995, there has been a steady increase in the number of new *Arats* and rice mills, particularly during the market liberalisation period between 1991 to 1995 (when about one-third of all the *Arats* and mills surveyed were established). It can be observed from the Figure 3.6 that there is a very close relationship between increases in the number of *Arats* and mills over time. Recent increases in the number of mills with credit facilities might have an impact on the simultaneous growth of *Arats*.

Figure 3.6 also shows a sharp decline in the number of projected *Arats* and mills during the period of 1996 to 2000 (which has been estimated on the basis of 1996 and 1997 data). Depressed paddy/rice trading during the last few years (as reported by the *Aratdars* and millers) along with drastic falls in the procurement of paddy/rice by the government might have negatively affected the recent growth of mills and *Arats*, but there are obvious dangers in extrapolating a linear trend into the future.

Figure 3.6 : Date of Establishment of Paddy *Arats* and Mills



Source: Phase II *aratdars* and millers survey, 1997

*estimated from 1996 and 1997 data.

Box 3.1: Growth of rice mills in the procurement regions

Before the liberation of Bangladesh in 1971, there were only a few rice husking mills in the procurement areas. Rice mills with parboiling, drying and husking facilities started growing from early 80's and during the last one decade their rate of establishment has sharply increased. For example, in Hapania in Naogaon *Sadar Thana*, there were only 3 rice mills in 1987 but now there are about 75 mills. In Mohadebpur, another *thana* under Naogaon district, there were only 3 rice mills in 1980. The number rose to 50 in 1990 and about 200 in 1997. Similar growth trend of rice mills was also found in Dinajpur and Sherpur mill areas. In Sherpur Sadar, number of mills has increased sharply since 1985-86 and now there are about 400 mills. According to the information provided by key informants, a large number of educated youths having no other alternative job opportunities entered into rice milling business by taking loan from the banks. However, relative advantages existed for those who owned land on which to establish their rice mill as this facilitated access to bank credit. Millers also report that rice milling is a profitable business as one can easily earn Tk. 60,000 to 80,000 per year even the mills are not operated by themselves (through renting out mill). Given the current bank interest rate on deposits below 10 percent per annum, this appears to be a reasonable return on an estimated investment of Tk. 750,000 for establishing a mill. An added attraction is possibly due to fast appreciation of real estate.

Not only have the numbers of *Arats* and mills increased over time, storage spaces of *Arats* and mills have also substantially increased. Table 3.2 shows that during the period between 1983 to 1988, virtually there has not been any change in the *Arat* space, but after that storage space gradually increased (by 1.32 times in 1997 compared to 1988). The storage space of the mills also increased substantially from 1983 to 1997 (more than 3 times). However, the millers had to rent more storage space from others compared to space available in their own mills.

Table 3.2: Change in storage capacity of *Arats* and mills over time

(in 100 Kg. per *Arat*/Mill)

Arat/Mill	Storage capacity	1983	1988	1992	1997
	Own *Arat*	1717	1673	1769	2434
Arat	Rented storage space	1000	1040	1187	1142
	All	2717	2713	2956	3581
Mill	Storage in own mill premises	1200	960	1439	1913
	Rented storage space	-	2000	2200	2132
	All	1200	2960	3639	4045

Source: Phase II *aratdars* and millers survey, 1997

The milling capacity (of the mills) has also increased over time. Average mill operating hours per day has increased from 6.25 hours in 1983 to 8.68 hours in 1997 and the amount of paddy husked per day has increased from 7200 Kg. to 8640 Kg. during the same period. The *Chatal* (paddy drying space in the mill premise) size has also increased from 7800 Kg. in 1983 to 11600 Kg. in 1997. The gradual increase in the milling capacity over time can be seen in Table 3.3.

Table 3.3: Change in Milling Capacity over Time

(Average per mill)

Particulars	1983	1988	1992	1997
Chatal size (in 100 Kg. of paddy)	78	90	100	116
Number of hours operated per day	6.25	7.4	8.15	8.68
Amount of paddy husked per day (in 100 Kg.)	72	78	80	86

Source: Phase II millers survey, 1997

Characteristics of *Aratdars* and Millers

Most of the *Aratdars* (95 percent) and millers (90 percent) had at least some level of education background. About one-third of the *Aratdars* (31 percent) and one-fourth (26 percent) of the millers had education below S.S.C. level. Most of them (46 percent of *Aratdars* and 51 percent of millers) had education up to S.S.C. or H.S.C. levels and some of them had also Graduation or Master degrees (18 percent of *Aratdars* and 13 percent of Millers). Therefore, in terms of education, both *Aratdars* and millers had almost similar types of qualifications. Most of them also had long experience in the *Arat* and milling business (average being 11 years in both the cases).

More than half of the *Arats* (60 percent) and mills (54 percent) were under single ownership while family ownership constituted another 20 percent in the case of *Arats* and 37 percent in the case of mills. Joint ownership was more prevalent in the case of *Arats* (20 percent) than the mills (9 percent). However, the number of partners in the case of joint ownership was very few (3 in the case of *Arats* and 2 in the case of mills). Almost all the *Arats* (95 percent) were managed by family members or by partners, while the hired managers managed only 5 percent. However, in the case of mills, the hired managers managed about 25 percent of them. Mills were owner operated (87 percent); only 13 percent were rented.

On the average, only 27 percent of the *Aratdars* and 49 percent millers had their own telephone connections. This was worst in the case of Naogaon where only 11 percent *Aratdars* and 33 percent millers had own telephone. The position in Dinajpur was better where 38 percent of the *Aratdars* and 58 percent of the millers had own telephone while in Sherpur, about a quarter (25 percent) of the *Aratdars* and half of the millers (50 percent) had own telephone.

The present owners established most of the Arats (91 percent) and mills (84 percent) while few were inherited. Farming was the previous occupation of about one-fourth of the founders of *Arats* and mills (26 percent Arats, 24 percent mills). Again, about 43 percent of the *Arat* founders were paddy *Farias* while 8 percent had rice mills and 2 percent had business of agricultural inputs. Previous occupations of the rest 20 percent *Arat* founders were non-farm business (8 percent), jute business (4 percent) and services (8 percent).

In the case of mills, about 30 percent of the mill founders were involved in the paddy business of which 15 percent were *Beparis*, 12 percent were crushers and 3 percent were paddy *Aratdars*. About 12 percent of the mill founders already had rice mills and another 3 percent rented mills; 12 percent were managers/employees in other rice mills and 18 percent had non-farm business. Therefore, more than half of the *Arat* and mill founders (51 percent for Arats and 57 percent for millers) were somehow or other attached with paddy trading or rice milling. Similar results were also found in Chowdhury's (1992) study which stated that a large proportion of the sample started up in the modest capacities of itinerant merchants or the owners of small rice mills, or as crushers.

Vertical, Horizontal and Diagonal Expansion of the *Arat* and Mill Owners

The Phase I survey work among the *Aratdars* and millers revealed that quite a large number of them were associated with rice or paddy business as well as other agricultural related business before and after establishing *Arats* or rice mills. The nature of expansion of these business activities were either vertical, horizontal or diagonal.[6] The vertical expansion again was in the upward or downward directions. For example, from *Faria* to *Aratdar* or from paddy *Aratdar* to rice millers can be considered as upward vertical linkage while rice mill owners to paddy *Aratdars* or rice wholesalers to rice mill owner may be considered as downward vertical linkages. Horizontal expansion is basically expansion of the same business (i.e. increased number of Arats or mills for the *Aratdars* and millers respectively). Diagonal expansion on the other hand has been defined as involvement in agricultural related business other than rice or paddy (i.e. agricultural input/equipment business, wheat/jute business, transport business, etc.). Although the transport (trucks) business as such is not directly related with agriculture; it has some relationship with rice/paddy business if the mill or *Arat* owners possess some transport like trucks.

The sample *Aratdars* and rice mill owners revealed that 64 percent of the *Aratdars* and 58 percent of the mill owners had been involved in agricultural related business (including paddy/rice) before establishing the *Arats* or the mills surveyed. Again, 56 percent of the *Aratdars* and 33 percent of the mill owners were involved in agricultural related business after establishing *Arats* and mills. Figure 3.7 shows that 37 percent of the present *Arat* owners were *Faria/Bepari* while 2 percent had also rice mills before establishing the *Arat*. Further it was found that 6 percent of these *Aratdars* had other *Arats* before establishing the *Arat* surveyed. Some (19 percent) have also entered into the paddy *Arat* business from the jute business (10 percent), agricultural input business, such as fertilizer, seed, etc. (7 percent) and

[6] Diagonal integration refers to firms diversifying into related agricultural (non-rice) activities. For example, wheat trading, agricultural input business, transport business, etc. The term diagonal integration is due to Harriss-White (1996).

transport business (2 percent). After establishing the *Arats*, 9 percent has become mill owners, 8 percent has started rice wholesaling business and the majority (39 percent) has diversified their business in to wheat trading (12 percent), jute trading (16 percent), agricultural input business (8 percent) and transport business (3 percent) (Figure 3.7).

In the case of millers, there had been vertically upward movement by paddy *Crushers* (9 percent), paddy *Beparis* (9 percent) and paddy *Aratdars* (4 percent) to millers and also vertically downward movement from rice retailer (2 percent) and rice wholesalers (9 percent) to millers (Figure 3.8). Again 12 percent of them had already other rice mill(s) and 4 percent were previously managers of other rice mills. Further, 3 percent of them became owner of other rice mills after establishing the mills surveyed. Another 3 percent started rice wholesale business; but majority of them (27 percent) started business in agricultural inputs (17 percent), agricultural equipment like ShallowTubewell (5 percent) and transport (5 percent). The overall picture emerging from our analysis shows that the majority of *Aratdars* (37 percent) started their businesses as *Farias/Beparis* while quite a good number of rice mill owners (22 percent) started their businesses as paddy *Aratdars, Beparis* or *Crushers*. However, the majority of the paddy *Aratdars* (39 percent) and millers (27 percent) have expanded their activities diagonally into agricultural related businesses other than rice or paddy.

Figure 3.7: Vertical, Horizontal and Diagonal Expansion of *Aratdars* Before and After Establishment

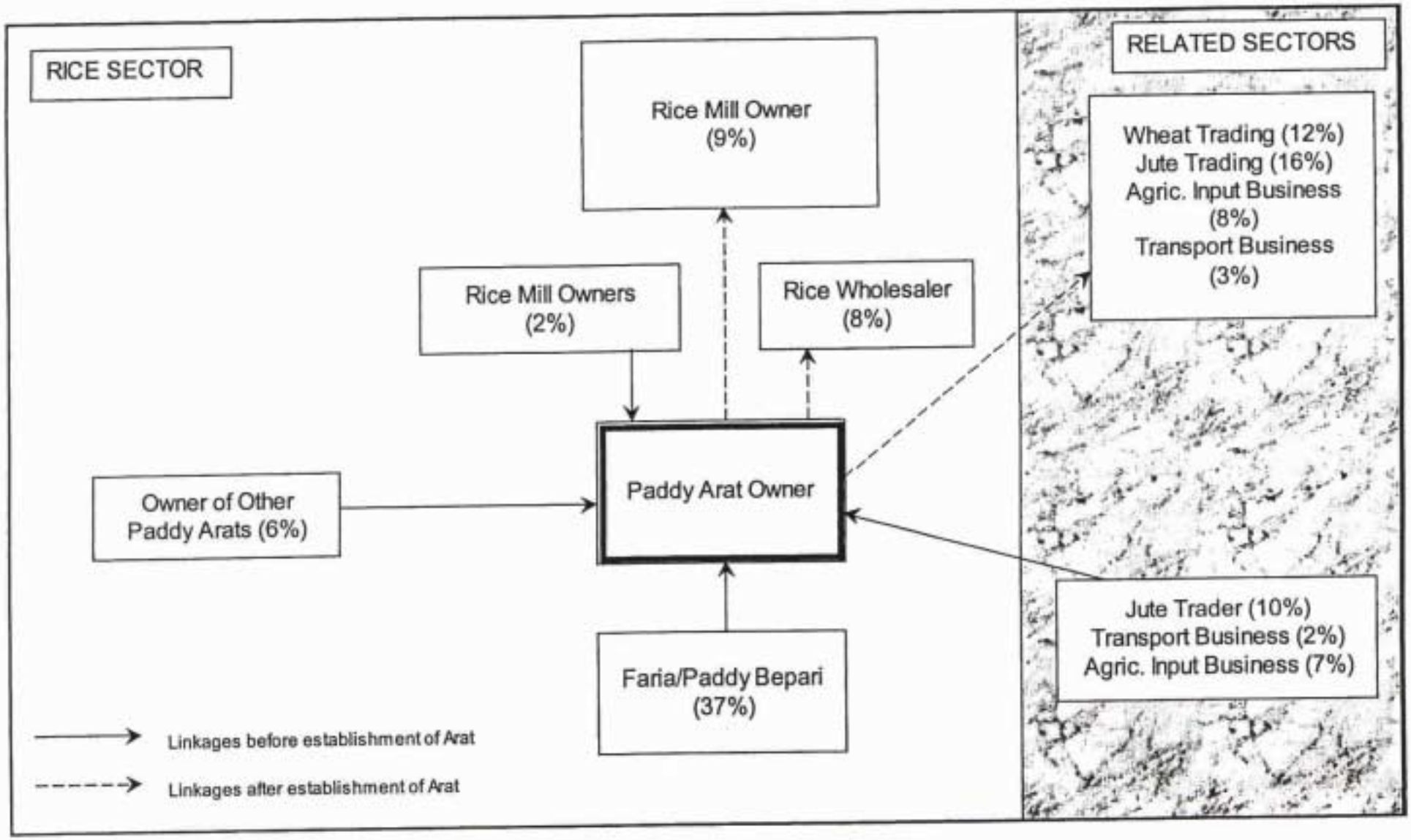
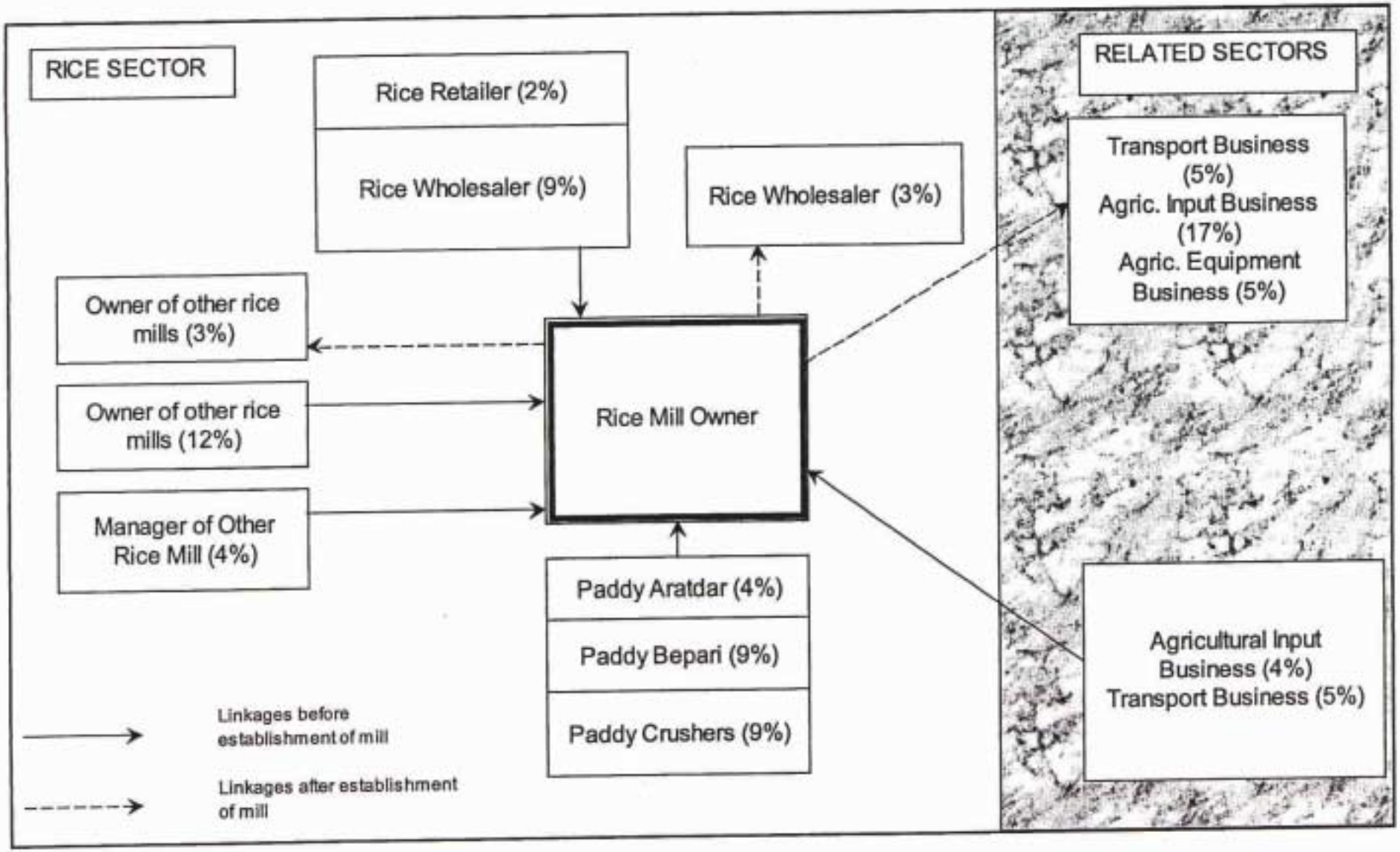


Figure 3.8: Vertical, Horizontal and Diagonal Expansion of Mills Before and After Establishment



VI. MARKET LINKAGES BETWEEN PADDY *ARATS* AND RICE MILLS

Forward and Backward Linkages of *Arats*

The *Aratdars* generally procure paddy from the primary markets (*Hats*) located in and around the *Thana* where their premises are located. They sell most of the paddy procured to local mills located in the same region (same district or neighbouring districts). However, some of *Arats* also have linkages with mills in distant places. On average, each of the selected *Arats* had linkages with 3 local and 2.5 distant mills for regular supply of paddy.

Arats located in Dinajpur region besides local mills, supplied paddy to the distant mills located mostly in the northern part of Bangladesh (i.e. Pabna, Natore, Naogaon, Bogra, etc.). Some *Arats* had also linkages with the mills located in Southern (i.e. Kushtia, Khulna, etc.) as well as central (i.e. Munshigonj) and South-east (i.e. Chittagong) regions of Bangladesh (Appendix Table 3.1). In Naogaon, it was found that *Arats* mostly supplied paddy to the mills in and around the same district. However, they also had linkages with mills located in other districts in north-west Bangladesh (Appendix Table 3.1). On the other hand, *Arats* located in Sherpur region (including Mymensingh and Jamalpur Districts), had linkages with the mills located in Chittagong and Dhaka region (including Gazipur and Munshigonj). The overall Phase II analysis indicates that paddy *Arats* located in Dinajpur and Naogaon regions mainly had linkages with mills located in north-west Bangladesh, while paddy *Arats* in Sherpur region had more linkages with the mills located in and around Dhaka and Chittagong.

Forward and Backward Linkages of Mills

Mills located in different locations under Dinajpur districts were found to procure paddy mostly from the *Arats* located in and around the same or surrounding *Thanas* of Dinajpur district (Appendix Table 3.2). However, some mills (located in Dinajpur *Sadar* and Bochagong *Thanas*) were also found to procure paddy from the *Arats* located in other neighbouring (i.e. Panchagar, Nilphamari, Gaibandha, Rangpur and Joypurhat). Mills in Naogaon were also found to procure paddy mainly from the *Arats* located in other *Thanas* of Naogaon district. Some mills also procured paddy from the *Arats* located in Dinajpur and Gaibandha districts. In the case of Sherpur, millers were found to procure paddy mainly from *Arats* located in different *Thanas* of the district, and from Mymensingh district. They also procured paddy from the neighbouring districts of Jamalpur and Netrokona. Therefore, the analysis indicated that in terms of paddy procurement, the millers are dependent mostly on the *Arats* located in

the same region. It was also found that to ensure a regular supply of paddy, each mill had, on average, linkages with two *Arats*.

In the case of rice, it was found that most of the rice millers had linkages with distant market wholesalers besides wholesalers of local market. On the average each of the mills had linkages with five local wholesalers and two long-distance wholesalers for regular supply of rice. Mills located in Dinajpur district (except Birol *Thana*) had linkages mostly with distant rice wholesalers of Dhaka region (i.e. Dhaka, Norshingdi, etc.). They also had linkages with rice wholesalers of Chittagong as well as Southern districts like Noakhali, Jessore, Khulna, Faridpur, etc. (Appendix Table 3.2). Again Naogaon *Sadar* millers were mostly linked up with Dhaka rice wholesalers. However, they had also linkages with wholesalers of Noakhali and Comilla. Some millers of Naogaon (Dhamoirhat thana) had also linkages with the wholesalers of Dhaka region (Gazipur and Norshindi). Sherpur millers on the other hand, besides Dhaka and Narayangonj were mostly linked up with the wholesalers of Chittagong and Noakhali. They had also linkages with the wholesalers of Munshigonj and Norshindhi of Dhaka region. The overall analysis indicates that millers of North-western part of Bangladesh (i.e. Dinajpur and Naogaon) are mostly linked up with the rice wholesalers of Dhaka region while the millers of Central Northern part of Bangladesh (i.e. Sherpur) besides Dhaka region, are more linked up with Chittagong and Southern regions.

VII. TRADE CREDIT FOR PADDY AND RICE MARKETING IN THE PROCUREMENT AREAS

Different Forms of Trade Credit

Transactions with *Aratdars* and millers for buying and selling of paddy or rice in the procurement areas involve various types of arrangements. The arrangements may be 100 percent cash payment, 100 percent deferred payment as well as mix of partial cash and deferred payments. Besides cash and credit transactions, sometimes farmers deposit their paddy with *Aratdars* or millers who pay them after sale of paddy (in the case of *Aratdar*)/rice (in the case of miller). *Aratdars* and millers procuring paddy also advance cash to the farmers, *Beparis*, etc. On the other hand, *Aratdars* also receive advances from millers (for supplying paddy) and again millers receive advances from rice wholesalers (for supplying rice). However, rather than sticking to any single arrangement, most of the *Aratdars* and millers employ a combination of these arrangements for their transactions.

Trade Credit for *Aratdars*

Aratdars with absolutely 100 percent cash payment arrangements for purchasing paddy were found to be very few; rather a mix of cash and deferred payments along with other arrangements were most common (Table 3.4). It was found that *Aratdars* had a mix of cash and deferred payment transactions with 62 percent of *Beparis*, 86 percent of other (small) *Aratdars* and 25 percent of farmers. A large proportion of transactions on this arrangement particularly with *Beparis* and other *Aratdars* indicated that credit was flowing from *Beparis*, small *Aratdars* as well as from farmers into running capital of (big) *Aratdars*.

On the other hand, the *Aratdars* also advanced credit not only to *Beparis* and other *Aratdars*, but also to some farmers for ensuring paddy supply for their *Arats* (Table 3.4). However, farmers also provided credit to the *Aratdars* in the form of paddy deposit to *Arats*, the value of which was paid after sale. Therefore, two-way flows of credit from farmers, *Beparis* and other *Aratdars* and again from *Aratdars* to these agents were observed.

In the case of paddy sale by *Aratdars* to local and long-distance millers, there were very few cases who opted for the transaction arrangement of only 100 percent cash or 100 percent deferred payments. The more common practice was a combination of both cash and deferred payments (Table 3.5). The arrangement of a of mix cash and deferred payments as well as paddy supply to the millers against advance taken from them (millers) was more prevalent for local millers than that of long-distance millers. However, the findings showed that the percentage of *Aratdars* who sold paddy to the millers on credit was higher than the amount who received credit from millers.

Table 3.4: Mode of Transactions between *Aratdars* and Different Agents for Purchasing Paddy (% of those who availed the mode)

Mode of transactions	In case of purchase from farmers	In case of purchase from *Faria/ Bepari*	In case of purchase from other *Aratdars*
1. 100 % cash payment	5	2	0
2. Mix of cash and deferred payments (include 100 % cash and deferred payments)	25	62	86
3. Mix of cash, deferred payments and purchase of paddy against advance given	6	36	14
4. Mix of cash, deferred payments and payment to farmers against deposited paddy	31	-	-
5. Mix of cash, deferred payments, purchase of paddy against advance given and payment to farmers against deposited paddy	33	-	-
All	100	100	100

Source: Phase II *aratdars* survey, 1997

Table 3.5: Mode of Transactions Between *Aratdars* and Different Agents for Selling Paddy (% of those who availed the mode)

Mode of transactions	In case of sale to local millers	In case of sale to long-distance millers
1. 100 % cash payment	0	6
2. 100 % deferred payment	2	0
3. Mix of cash and deferred payments (include 100 % cash and deferred payments)	61	73
4. Mix of cash, deferred payments and supply of paddy against advance received from millers	37	21
All	100	100

However, the direction of credit flow to and from *Aratdars* was found to depend on demand and supply situations of paddy in the market. The analysis indicated that in the peak periods of *Aman* and *Boro* harvest, both cash and partial credit transactions took place that indicated that during this period *Aratdars* took advantage of having credit from *Beparis* and farmers. On the other hand, *Aratdars* had to advance to the *Beparis* or farmers in the pre-*Aman* and Pre-*Boro* periods when supply of paddy in the market was very low. Further, *Aratdars* also received cash advances from millers, particularly from

local millers during these lean periods. However, although general trends of the credit flows had been investigated, the magnitude of the credit flows to each of the market intermediaries had not been investigated in this study.

Trade Credit for Millers

In the case of millers, 100 percent transactions only in cash were found to be mostly with farmers and very few cases with *Beparis* and *Aratdars* (Table 3.6). The most common transaction arrangement with the *Beparis* and *Aratdars* was mix of cash and deferred payments. About one-fourth of the farmers also availed this arrangement. However, about one-third *Beparis* and *Aratdars* took advances from millers who also availed partial cash and deferred payment arrangement (Table 3.6). Some farmers (19 percent) also received advance from millers, but more than one-third (38 percent) mills accepted paddy deposits from farmers who were paid after sale of husked rice. The prevalence of a large number of cases with cash and deferred payment arrangements along with the arrangement of payment to the farmers against deposited paddy on the one hand, and relatively small cases of 100 percent cash transactions as well as purchase of paddy against advances on the other hand, indicated that in the two-way flows of credit, the millers got more credit from suppliers of paddy than they advanced credit for purchasing paddy.

In the case of rice sale by the millers, about one-fourth (27 percent) independent rice *Beparis* and about one-fifth (19 percent) long-distance rice wholesalers paid 100 percent cash while purchasing rice. None of the local rice wholesaler paid 100 percent cash to the millers. Rice selling on 100 percent deferred payment arrangement was found to be negligible (Table 3.7). Again, mix of cash and deferred payment was the most common arrangement availed by about half of the independent *Beparis* (45 percent) and long-distance rice wholesalers (48 percent) as well as more than four-fifth (84 percent) of the local wholesalers.

Table 3.6: Mode of Transactions between Millers and other Paddy Marketing Agents (% of those who availed the mode)

Mode of transactions	In case of purchase from farmers	In case of purchase from *Faria /Bepari*	In case of purchase from *Aratdar*
1. 100 % cash payment	19	4	3
2. Mix of cash and deferred payments (include 100 % cash and deferred payments)	24	60	63
3. Mix of cash, deferred payments and payment in terms of paddy against advance provided by the millers	0	36	34
4. Mix of cash, deferred payments and payment to farmers against deposited paddy on rice sale	38	Na	na
5. Mix of cash, deferred payments, payment to farmers against deposited paddy on rice sale and payment in terms of paddy against advance provided by the millers	19	Na	na
All	100	100	100

Source: Phase II millers survey, 1997

na = not applicable

Table 3.7: Mode of Transactions between Millers and other Rice Marketing Agents (% of those who availed the mode)

Mode of transactions	In case of sale to independent *Beparis*	In case of sale to local wholesalers	In case of sale to long-distance wholesalers
1. 100 % cash payment	27	0	19
2. 100 % deferred payment	0	3	5
3. Mix of cash and deferred payment (include 100% cash and deferred payments)	45	84	48
4. Mix of cash, deferred payments and supply of rice against advance received	28	13	28
All	100	100	100

Source: Phase II millers survey, 1997

On the other hand, in addition to cash and deferred payments, about a quarter of millers (28 percent) selling rice to independent *Beparis* and long distance rice wholesalers had done so after receiving advances from their buyers. In the case of sales to local rice wholesalers, advances were reported by only 13 percent of millers. Therefore, millers received credit from farmers, *Beparis* and *Aratdars* whenever purchasing paddy on a deferred payment basis and also advanced credit to independent *Beparis*, local and long-distance rice wholesalers for their rice activities. Again, the direction and magnitude of these two-way credit flows were dependent on the seasonal market demand-supply positions for paddy and rice.

Change in the Directions of Transaction Arrangements Over Time

Changes in the transaction arrangements for buying and selling of paddy/rice (by the *Aratdars* and millers) over the last 5 years were investigated as part of the Phase II survey work. Table 3.8 shows that in the case of purchase of paddy by the *Aratdars* from the farmers, cash transactions have increased. In the cases of *Beparis* and other *Aratdars* the extent of both cash and/or credit transactions has remained unchanged. On the other hand, the extent of cash advances to farmers and *Beparis* for purchasing paddy has decreased over time while this has remained unchanged for the other (small) *Aratdars*. Further, the extent of paddy sale by the farmers keeping paddy at the *Arats* and getting money after sale has also decreased over time. Again, deferred payment by the millers (both local and long-distance) has increased and at the same time cash advances by the millers for purchasing paddy from *Aratdars* has decreased over time.

Table 3.8: Change in the Directions of Transaction Arrangements over Time by Paddy *Aratdars*

Mode of Transactions	Direction of Change for paddy purchase from			Direction of Change for paddy sales to	
	Farmer	*Faria/ Bepari*	Other *Aratdars*	Local mills	Long-distance mills
Cash transactions	↑	→←	→←	↓	↓
Deferred payment	↓	→←	→←	↑	↑
Cash advances (from *Aratdars* for buying and to *Aratdars* for selling paddy)	↓	↓	→←	↓	↓
Payment against farmers' deposited paddy	↓	Na	na	na	na

Source: Phase II *aratdars* survey, 1997

Note : ↑ = increased, ↓ = decreased and →← = unchanged

In the case of millers, cash transactions over the last 5 years have decreased for both buying paddy and selling rice. For procuring paddy, the extent of cash advance to the *Beparis* has decreased while this has remained unchanged for farmers and *Aratdars*. Again, the extent of payment to the farmers after sale of farmers' deposited paddy has increased, but was found to have decreased for the *Aratdars*. Cash advances by rice wholesalers to millers to ensure rice supply has decreased, while this has remained unchanged in the case of independent *Beparis*. The overall analysis indicated that the extent of cash advances for buying and selling paddy/rice has decreased over time for both *Aratdars* and millers.

Table 3.9: Change in Transaction Arrangements over Time by Millers

Mode of Transactions	Direction of Change for paddy purchases from			Direction of Change for sales to		
	Farmer	*Faria/ Bepari*	*Aratdar*	Indepen -dent *Bepari*	Local rice whole-saler	Long-distant rice whole-saler
Cash transactions	↓	↓	↓	↓	↓	↓
Deferred payment	↑	↑	↑	↑	↑	↑
Cash advances (from millers for buying paddy and to millers for selling rice)	→←	↓	→←	→←	↓	↓
Payment against farmers' deposited paddy	↑	Na	na	na	na	na

Source: Phase II millers survey, 1997

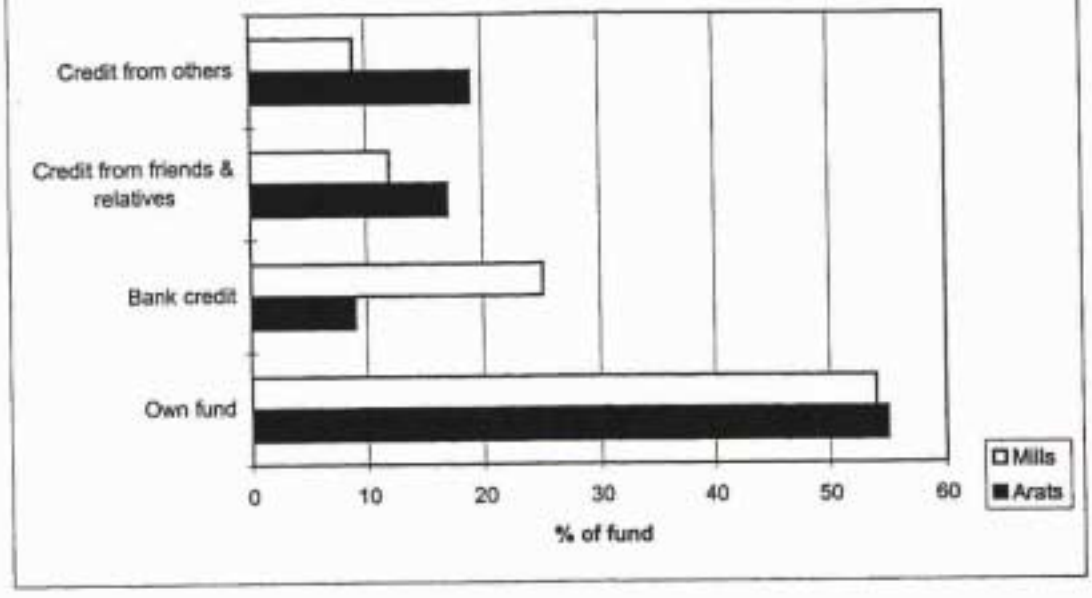
Note: ↑ = increased, ↓ = decreased and →← = unchanged

VIII. SOURCES OF CAPITAL FOR *ARATDARS* AND MILLERS

The minimum amount of capital needed to start a paddy *Arat* business was estimated at about Tk. 1,50,000 and that for a rice mill was about Tk. 7,50,000[7]. It was found that only 17 percent of *Aratdars* and 12 percent of millers had relied exclusively on their own funds for establishing their businesses. However, on average, *Aratdars* and millers used their own funds to pay for 55 percent and 54 percent (respectively) of their establishment costs (Figure 3.9). For *aratdars* the remaining funds came mainly friends, relatives and others (particularly from farmers and Beparis). For millers additional funds came mainly from banks (25 percent). However, banks provided only 9 percent of *Aratdars*' establishment costs.

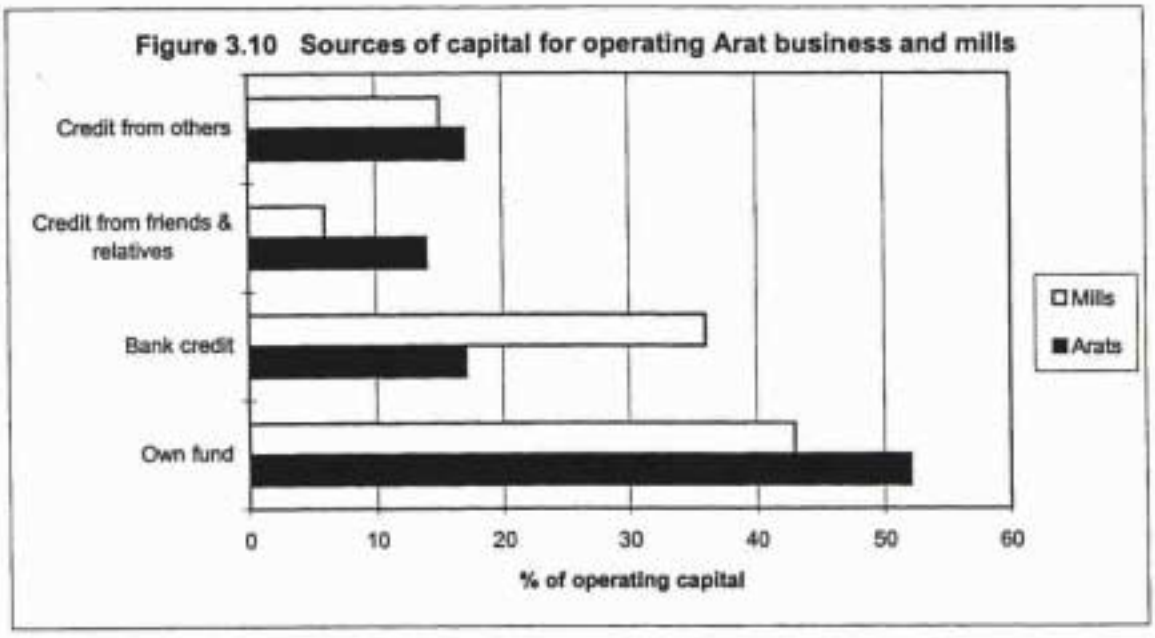
[7] These figures relate to approximate business start-up costs (as stated by the sampled paddy *arats* and mill owners) in the last quarter of 1997.

Figure 3.9 Sources of fund for establishing Arats and mills



Source: Phase II *aratdars* and millers survey, 1997

In the case of operating capital, only 11 percent *Aratdars* and 5 percent millers had relied exclusively on their 100 percent own funds. On average, out of total operating capital the share met from *Aratdars'* own funds was 52 percent and that of Millers was 43 percent. Banks provided a further one-third of operating capital to the millers but only 17 percent for *Aratdars* (Figure 3.10). So *Aratdars* had to depend on friends, relatives and others (mostly farmers who deposited paddy with them) for their operating capital. The findings indicate that while millers have better access to bank credit facilities than *Aratdars* we hypothesise that this is because most paddy *Arats* are located in rural areas where banking facilities are not so good. Furthermore, compared to millers, *Aratdars* have a lower quantity of firm specific fixed assets that can act as collateral against bank loans.



Source: Phase II *aratdars* and millers survey, 1997

IX. PROBLEMS FACED BY PADDY *ARATDARS* AND RICE MILLERS

Aratdars' Problems

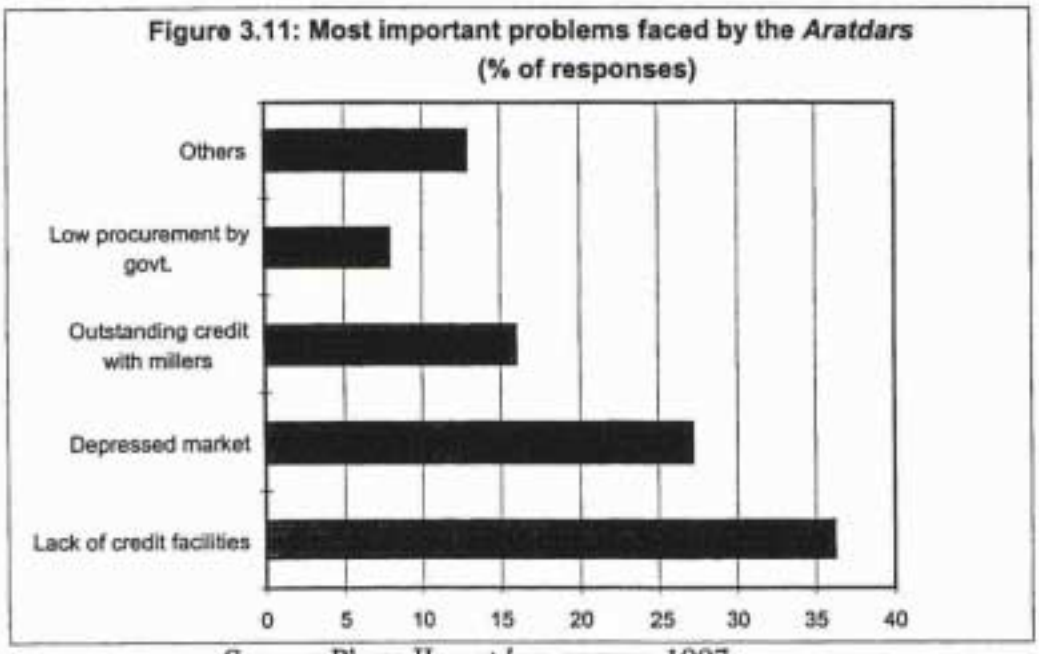
The most important problem facing *Aratdars* (as reported by 36 percent of the sample) was lack of institutional credit facilities (Figure 3.11). The *Aratdars* surveyed found difficulties in getting credit from banks as there were no bank branches in some places. Furthermore, in the places where bank branches existed, many *aratdars* stated they avoided taking credit from them because their interest rate seemed too high. The *Aratdars* also complained about the corruption of bank officials in sanctioning credit. Some of them alleged that for sanctioning credit, bank officials expected a bribe equal to approximately 30 percent of the amount of the loan.

The second most important problem (as reported by 27 percent of the *Aratdars*) was depressed market conditions. This is because of the fact that competition in the paddy trade has increased with the rise in the numbers of *Aratdars* in recent years. This has resulted in a lower volume of transactions as well as lower profits, for individual firms. The prices of paddy and rice have also been low in recent years, and this has resulted in low profit levels.

The third most important problem (as reported by 16 percent *Aratdars*) was outstanding credit with rice millers. The *Aratdars* reported that as the amounts of deferred payment with millers was often so large, that their operating capital remained blocked.

Finally, some (about 8 percent) *Aratdars* reported that as the volume of government procurement, in particular rice has been reduced, the volume their business has also declined. Lower procurement of paddy/rice by the PFDS has also depressed market prices, as a result of which *Arats'* profit margins have been reduced. Besides these problems, 13 percent of the *Aratdars* reported other problems which included lack of telephone facilities, communication problems, excess market tolls, and problems arising from political instability.

Figure 3.11: Most important problems faced by the *Aratdars* (% of responses)



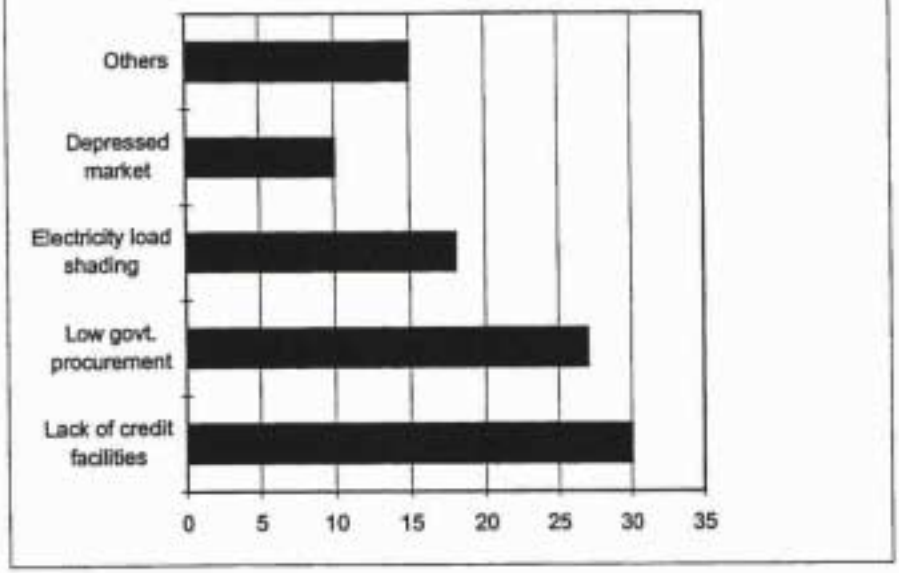
Source: Phase II *aratdars* survey, 1997

Millers' Problems

Like *Aratdars*, lack of credit was found to be millers' most important problem (Figure 3.12). They also noted problems arising from the high interest rates charged by banks that deterred them from using institutional credit facilities. Low government procurement of rice from mills was reported (about 27 percent millers) to be millers' second most important problem. Their third most important problem (reported by 18 percent) was frequent electricity failures or load shedding. Such power supply problems affect mills' operation particularly in the peak seasons of trading.

Further, some 10 percent of millers reported depressed market conditions as an important problem. They mentioned that profit levels in recent years has been squeezed by the low demand for rice as compared to its supply. They also mentioned that when excess rice is imported this further depresses the market price. Their other problems (reported by 15 percent of millers) were non-payment or irregular payment by rice wholesalers (which blocked their capital), lack of telephone facilities, political instability, etc. (Figure 3.12).

Figure 3.12 Most important problems faced by millers (% of responses)



Source: Phase II millers survey, 1997

X. *ARATDARS'* AND MILLERS' SUGGESTIONS FOR SOLVING THEIR PROBLEMS

Both *Aratdars* and millers were asked about their suggestions for solving the problems they had faced in recent years. There were close similarities with respect to the two groups' suggestions. The majority of both *Aratdars* (63 percent) and rice millers (70 percent) suggested that government procurement of both paddy and rice should be increased. In this connection, they suggested that procurement of paddy directly from farmers (rather than through middlemen/*Farias*) and of rice direct from mill gate should be increased. In this connection they also suggested to employ honest procurement officers.

The second most important suggestion from *Aratdars* (23 percent) and millers (17 percent) was to expand and improve credit facilities. In this respect they suggested reducing bank interest rates and establishing new bank branches in rural areas.

The suggestions in the other categories were somewhat different for *Aratdars* and millers. In the case of *Aratdars* (14 percent) these were: improvement of road communication, extension of telephone services, reduction of market tolls, etc. In the case of millers (13 percent) they were: solving electricity problems, checking corruption of bank officials and restricting rice imports, etc.

Paddy-Rice Price Linkages

Of the three procurement areas considered in Phase II, paddy price series were only available for districts that are know to trade with Naogaon. These included Joypurhat, Bogra, Rajshahi and Chapai Nawabganj. While weekly rice prices for Naogaon and Bogra markets were already available from the Phase I study, a large number of observations were found to be missing from the time series on paddy prices obtained from the Department of Agriculture Marketing (DAM). So to reduce the relative share of missing values in the data, our exercise had to limit itself to Naogaon, Bogra and Joypurhat. Weekly price observations available from DAM for the specified period ranged from 67 percent to 95 percent. Relatively more observations were missing for the period prior to July 1992 than the later period.[8] The remainder was interpolated using the linear interpolation routine in SPSS for Windows, version 6.1.

In order to identify whether paddy prices drive rice prices, or vice versa, bivariate and multivariate Granger causality tests were employed. However, the appropriate specification to use in testing for Granger causality depends on the stationarity of the individual (univariate) price series and whether the pairwise combinations of them are cointegrated. Applying the Augmented Dickey-Fuller (ADF) test with a constant term, it was found that the null hypotheses of non-stationarity (in levels) could not be rejected at the 1 percent level of significance for four of the series, but could be rejected at the 5 percent for the remaining three.[9] All price series were however found to be stationary in their first differences. Independent tests, of the Engle Granger type, were administered for the order of cointegration between pairs of price series. Estimated ρ statistics were all lower than –3.759, and therefore, the series are

[8] Percentages of observations recorded by DAM for the period 1987:23 to 1992:52 ranged from 53 to 90, while it ranged from 75 to 90 for the period 1993:01 to 1996:15. 1987:23 means week number 23 in the fiscal year 1987-88.

considered not to be pair-wise cointegrated. The appropriate model for test of Granger causality would therefore include lagged price changes, and not lagged price levels.

Thus, with two optimal lags, the unrestricted model in a bivariate test for Granger causality was:

$$\Delta y_t = \alpha + \beta_1 \Delta y_{t-1} + \beta_2 \Delta y_{t-2} + \gamma_0 \Delta x_t + \gamma_1 \Delta x_{t-1} + \gamma_2 \Delta x_{t-2} + u_t$$

The null hypothesis is that price changes in one market are not Granger caused by price changes in another market, and the ratio of the unrestricted and restricted residual sum of squares has an F-distribution. In the multivariate case, a VAR (vector autoregression) in first differences is the appropriate estimation method, and we test whether price changes in a set of markets are block exogenous to price changes in another set of markets. Log-likelihood ratios of the determinants of restricted and unrestricted variance-covariance matrices, which follows a χ^2-distribution, are used to test for block exogeneity.

Table 3.10 summarises the results of both sets of Granger causality tests. In order to capture the changes in market integration due to liberalisation in 1992, separate tests for Granger causality were run for two sub-periods, the cut-off being June-July 1992. Moreover, bivariate Granger causality tests between Naogaon rice prices and Joypurhat paddy prices have been separately presented (since Naogaon is know to be the most important rice wholesale market in the region, and Joypurhat is reported to be an important source of paddy for the Naogaon rice wholesalers).

[9] The augmented Dicker Fuller statistics for the estimated ρ's for paddy price in Naogaon, Joypurhat and Bogra were -3.243, -2.95 and –3.685, respectively. The corresponding figure for rice price series in Naogaon and Bogra were -2.9612 and –2.487.

Table 3.10: Summary Statistics from Tests on Granger Causality

Null hypothesis	Value of F, Chi-squared	Significance level
For the whole sample period: 1987:23 to 1996:15		
Naogaon-Bogra rice prices exogenous to paddy prices	109.43	0.000000
Naogaon rice price exogenous to Joypurhat paddy price	(7.43)	0.000001
Paddy prices exogenous to Naogaon-Bogra rice prices	90.71	0.000000
Joypurhat paddy price exogenous to Naogaon rice price	(3.99)	0.00147
Pre-liberalisation period: 1987:23 to 1991:52		
Naogaon-Bogra rice prices exogenous to paddy prices	41.85	0.000001
Naogaon rice price exogenous to Joypurhat paddy price	(3.20)	0.00824
Paddy prices exogenous to Naogaon-Bogra rice prices	29.44	0.003391
Joypurhat paddy price exogenous to Naogaon rice price	(1.69)	0.13792
Post-liberalisation period: 1992:01 to 1996:15		
Naogaon-Bogra rice prices exogenous to paddy prices	93.06	0.000000
Naogaon rice price exogenous to Joypurhat paddy price	(4.134)	0.001313
Paddy prices exogenous to Naogaon-Bogra rice prices	92.53	0.000000
Joypurhat paddy price exogenous to Naogaon rice price	(2.58)	0.027448

Note: Test statistics in parentheses are F-statistics. Others are chi-squared. The degrees of freedom for the three periods considered are (5, 457), (5, 233) and (5, 218) respectively.

The null hypothesis that changes in rice prices are exogenous to changes in paddy prices in the set of markets considered was rejected at the 1 percent level for the multivariate Granger causality tests. Similarly, the exogeneity of paddy prices to rice prices was rejected at 1 percent level. While these results hold separately for the pre and post-liberalisation periods, one may note that the value of the chi-squared statistics is much lower in the pre-liberalisation period. The constrast between paddy-rice price linkages in the two periods is more adequately revealed when one tests for bivariate Granger causality between Naogaon rice prices and Joypurhat paddy prices. The null hypothesis that Joypurhat paddy prices are exogenous to Naogaon rice prices could not be rejected at the 10 percent level for the pre-liberalisation period; while it could be rejected at the 5 percent level for the post-liberalisation period. The findings suggest that Naogaon rice prices are always "Granger caused" by Jopurhat paddy prices, while the reverse does not always hold.

The findings generally suggest that changes in paddy prices are better predictor of changes in rice prices than vice-versa. Since only a limited set of markets in one area of the country has been analysed, two alternative explanations may be put forward in support of our findings.

First, individual paddy markets in and around Naogaon may respond to price changes in several wholesale rice markets simultaneously. This may explain why price changes in the paddy market may not be Granger caused by price changes in just one or nearby rice markets. Such a situation may indicate that the relative strength of local marketing hubs (in which several paddy markets are presumed to serve one rice wholesale market) is on the decline. It would also suggest the existence of either long-distance trading, or, trading through local mills that by-pass the local wholesale rice market. A second explanation involves the difference in results across the sub-periods, and generally support the view that liberalisation has led to an increased integration between the paddy and the rice markets. It is quite possible that government interventions during the pre-liberalisation period induced distortion in traders' behaviour that, in turn, caused paddy prices to vary independently of wholesale rice prices. Such a conjecture could be further verified with more recent data that are expected to reflect the outcomes of the more extensive government procurement programme during 1996-97 and 1997-98.

XI. SUMMARY AND CONCLUSIONS

This chapter's investigations of alternative marketing chains in the procurement areas have revealed that chains have become shorter. More farmers are now selling paddy directly to the *Aratdars* while millers are bypassing *Farias*. This was mainly because of the fact that farmers' access to mills and *Arat* centres has increased due to improvement of road communication and establishment of more *Arats* and mills in rural areas. However, in the case of selling rice by the millers in some cases the existence of brokers was found between millers and local wholesalers. This was more common in the case of Sherpur for selling rice to the long-distance rice wholesalers.

Among the various agents involved in supplying paddy to *Aratdars*, farmers played the most significant role; even in the case of millers, their position was very close to that of *Aratdars*. This further confirms the shortening of marketing chain and more access to mills and *Arats* by the farmers.

Millers were found to be involved in custom milling mostly in the off seasons (pre-*Boro* and Pre-*Aman*) when there were shortage of paddy supply (both from farmers and *Aratdars*). The percentage of custom milling was only 5 percent of the total paddy processed out of which private crushers supplied 70 percent and government supplied 30 percent of the paddy. Custom milling in lean periods helps millers to meet overhead expenses (particularly, permanent labour). As the supply of paddy from government

in recent years has reduced (due to reduction in paddy procurement), millers are facing problems of operating mills particularly in the off seasons.

Intermediaries' profit margins in the procurement areas seem to vary with paddy/rice prices. They usually remain at a low level in the peak trading periods (just after harvesting of paddy) and rise towards the end of seasons or during the periods of heavy rainfall (when the processing of paddy by mills declines).

The Phase II analysis examined the involvement of *Aratdars*/millers in agricultural related business before and after their *Arats*/mills were established. Firm histories reveal that the majority of *Aratdars* (37 percent) started their initial businesses as a *Faria* or *Bepari*, while quite a good number of rice mill owners (22 percent) started their business as paddy *Aratdars*, *Beparis* or *Crushers*. More than 80 percent of the sampled *arats* and mills had also been established after 1980. However, after establishing their *Arats* and mills, about 39 percent of *aratdars* and 27 percent of millers diversified their businesses diagonally into other agricultural related businesses. Thus, there has been a gradual vertical expansion in paddy/rice marketing and diagonal diversification from rice/paddy business to other forms of agricultural related business in the procurement areas.

Different forms of transactions exist in paddy/rice marketing in the procurement areas. However, a mix of cash and deferred payments rather than pure cash or credit transactions was found to be the dominant mode of transactions. In addition, transactions against advances as well as deferred payment to the farmers against paddy deposited with *Arats*/mills were also common. However, transaction arrangements have undergone some changes over time. For example, in the case of paddy purchases from farmers, *Aratdars* now have to pay more in cash than before. On the other hand, farmers' pure cash transactions with millers have reduced over time, while, deferred payment to farmers against deposited paddy has increased. The findings indicate that compared to *Aratdars*, farmers' transactions with millers have increased over time. Since farmers also get a higher price through direct sale to millers, this may also be one of the reasons for the increase in cash transactions between farmers and *Aratdars*. However, both for *Aratdars* and millers the extent of cash advances has reduced over time. This implies reduction of credit flows on the one hand and less volume of (paddy/rice) trading in recent years on the other hand.

Both *Aratdars* and millers had to depend mostly on own funds for establishing and operating their businesses. However, millers were found to have better access to bank credit than *Aratdars*. This may,

in part, be due to the limited number of bank branches in rural areas. Furthermore, when compared to millers, *Aratdars* were in a disadvantageous position with respect to collateral.

The most important problem for both *Aratdars* and millers was lack of own capital combined with institutional credit failures. Corruption of bank officials when sanctioning credit, as well as the high interest rate charged by the banks were found to be the key reasons that *aratdars* and millers avoid bank credit. Other important problems for *Aratdars* included depressed market conditions, outstanding credit with millers (which blocked their own capital), low government procurement, and lack of telephone facilities. For millers, after credit problems, low government procurement, frequent electricity failures, and depressed market conditions were the most important.

In order to solve the problems, both *Aratdars* and millers gave the highest priority to higher procurement levels by the government followed by more credit facilities.

Finally, an analysis of paddy-rice price relations in and around Naogaon revealed that liberalisation has led to increased integration between the paddy and rice markets. It is possible that this reflects the decline in relative power of local wholesalers, and the bypassing of local wholesale markets by millers.

Table A3.1: Location of the Selected Mill Clusters

Regions	Location of selected milling clusters	Number of mills located in each cluster	*Thana*
Dinajpur	1. South Pulhat	79	Dinajpur Sadar
	2. North Gosaipur	14	Dinajpur Sadar
	3. Biral Bazar	24	Biral
	4. Subidhat (Shetabgonj)	53	Bochagonj
	5. Chirirbandar, Panchayet	22	Chirirbandar
	6. And Majhipara	45	
Naogaon	6. Hapania	45	Naogaon Sadar
	7. Mohadebpur	106	Mohadebpur
	8. Dhamurhat	17	Dhamurhat
Sherpur	9. Dhakalhati	35	Sherpur Sadar
	10. Narayanpur	12	Sherpur Sadar

Table A3.2: Location of the Selected *Arat* Clusters

Regions	*Arat* Locations	Number of *Aratdars* in each cluster	*Thana*	District
Dinajpur	1. Ambari hat	24	Parbotipur	Dinajpur
	2. Puran Bazar & Natun Bazar	17	Parbotipur	Dinajpur
	3. Phulbaria Bazar	14	Phulbari	Dinajpur
	4. Dugdugi Hat	17	Sadar	Dinajpur
	5. Birampur Bazar	35	Ghoraghat	Dinajpur
	6. Jayaand Hat	16	Birampur	Dinajpur
	7. Hilli	10	Kaharole	Dinajpur
	8. Boda Bazar	25	Hakimpur Boda	Panchagar
Naogaon	9 Fathepur	19	Dhamurhat	Naogaon
	10. Nimatpur Bazar	11	Niamatpur	Naogaon
	11. Chaubaria	23	Manda	Naogaon
	12. Nazipur	15	Patnitala	Naogaon
	13. Matagihat	22	Mohadebpur	Naogaon
Sherpur	14. Nakhla	35	Nakhla	Sherpur
	15. Melandah Bazar	13	Melandah	Jamalpur
	16. Naitkandi	12	Fulpur	Mymensingh

Table A3.3: Linkages of *Arats* with distant mills

Arat locations (*Thana*)	Linkages with distant mills (Districts)
Dinajpur region :	
Ambarihat (Parbotipur)	Pabna*, Chapai Nawabgonj, Kushtia, Sherpur, Faridpur and Khulna
Puran & Natun Bazar (Parbatipur)	Natore and Pabna
Dug Dugihat (Ghoraghat)	Munshigonj*, Pabna*, Natore*, Bogra*, Naogaon* and Joypurhat
Phulbaria Bazar (Phulbari)	Chittagong*, Pabna*, Feni and Kushtia
Birampur Bazar (Birampur)	Natore*, Naogaon*, Khulna*, Bogra*, Munshigonj, Chittagong, Pabna and Kushtia
Joynandhat (Kaharole)	Bogra*, Rangpur and Pabna
Hilli (Hakimpur)	Pabna*, Naogaon*, Faridpur, Bogra, Munshigonj, Khulna and Natore
Boda Bazar (Boda)	Bogra*, Sherpur, Naogaon and Pabna
Naogaon region:	
Fatepur (Dhamurhat)	Rajshahi
Niamatpur Bazar (Niamatpur)	-
Choubaria (Manda)	-
Nazipur (Patnitala)	Pabna
Matajihat (Mohadebpur)	Bogra
Sherpur region :	
Nakhla (Nakhla)	Gazipur and Dhaka
Vaitkandi (Phulpur)	Gazipur* and Chittagong*
Melandah Bazar (Melandah)	Munshigonj and Chittagong

* indicates important linkages.

Table A3.4: Linkages of mills with *Arats* and distant wholesale rice markets

Mill locations (*Thana*)	Linked up *Arat* locations		Linked up distant wholesale rice markets
	Thana	District	Districts
Dinajpur *Sadar*	Dinajpur*, Chirirbandar*, Hakimpur*, Birampur*, Phulbari*, Kaharol and Birgonj	Dinajpur	Dhaka*, Narayangonj, Feni, Chittagong and Faridpur
	Boda	Panchagar	
	Domar	Nilphamari	
	Gobindagonj	Gaibandha	
Birol	Phulbari*,Birampur*,Ghoraghat*, Chirirbandar*, Birol* and Hakimpur	Dinajpur	-
Bochagonj (Shetabgonj)	Kaharol* and Hakimpur*	Dinajpur	Dhaka*, Narshingdi*, Comilla, Feni, Chittagong, Khulna, Jessore, Noakhali
	Joypurhat* and Panchbibi*	Joypurhat	
	Boda	Panchagar	
	Pirgacha	Rangpur	
Chirirbandar	Chirirbandar* and Parbatipur*	Dinajpur	Dhaka, Chittagong and Feni
Naogaon *Sadar* (Hapania)	Niamatpur*, Patnitala *, Manda*, Mohadebpur*, Shapahar* and Dhamoirhat	Naogaon	Dhaka*, Noakhali and Comilla
	Dinajpur *Sadar*, Ghoraghat and Birampur	Dinajpur	
	Gaibandha	Gaibandha	
Mohadebpur	Patnitala*, Dhamoirhat*, Porsha*, Manda, Shapahar and Mohadebpur	Naogaon	-
Dhamoirhat	Dhamoirhat*	Naogaon	Gazipur and Narshingdi
Sherpur *Sadar*	Nakhla*, Nalitabari* and Jhenaigati*,	Sherpur	Dhaka*, Narayangonj*, Chittagong*, Noakhali*, Munshigonj, Narshingdi and Feni.
	Phulpur*, Gowripur* and Haluaghat	Mymenshingh	
	Jamalpur, Dewangonj, Melandaha and Bakshigonj	Jamalpur	
	Netrokona	Netrokona	

* indicates important linkages.

CHAPTER 4: RICE MARKETING IN THE TERMINAL MARKETS

I. INTRODUCTION AND SAMPLING DESIGN

The structure of rice marketing in Bangladesh has a wide diversity, both across time and across regions. Naturally, separate study of rice marketing in different regions might explain what are the principal differences in the structure of rice marketing across the regions and what are the key factors that lead to such diversity. This is important not only for academic researchers, but also for policy makers, as a set of uniform policies across the whole country may not be appropriate. This chapter tries to explain the major features of rice marketing in the terminal markets in Bangladesh. These will be compared and contrasted with the study's findings concerning the structure of rice marketing in procurement areas described in the previous chapter.

The two terminal rice markets considered in Phase II of the study, Chittagong and Dhaka, differ significantly from the rice procurement areas in Dinajpur, Naogaon, Sherpur considered in the previous chapter. First, Dhaka and Chittagong are the two largest metropolitan cities in Bangladesh and major terminal markets, and therefore absorb much of the production generated by the rice-procurement areas. Second, the dynamics and movement of rice through the marketing chain differ in many important ways between markets in the terminal and procurement areas. So, by studying these two groups of markets, we hope to get enough insights to present a unified picture of rice marketing in Bangladesh.

The choice of Chittagong and Dhaka to represent the terminal markets of the country as a whole is clearly an abstraction. At the same time, however, it is also true that Chittagong and Dhaka play a number of important roles in the national rice marketing system. These roles include acting as centres of price discovery/formation, and as *entrepots* (i.e., clearing/transhipment points) in addition to sources of demand.

In these terminal markets, Phase II of the study concentrated on rice wholesalers, millers, and retailers. Paddy *beparis* and assemblers are not considered, as paddy is normally procured in the procurement areas considered in the previous chapter. However, some millers in the terminal markets procure paddy (mainly from the North-west), process it, and then sell the milled rice either to the local rice wholesalers or to the rice wholesalers in the long distance markets. So rice millers in the terminal markets were included in this component of the study. Furthermore, since Phase I of

the study focused on the inter-district rice wholesalers, the major thrust of Phase II has been on millers and retailers in the terminal markets. Rice wholesalers in the terminal markets were, however, surveyed as part of the Phase II fieldwork to gain further information on how different wholesale markets had evolved over time and about their trade credit arrangements with other agents higher or lower in the rice marketing chain. The Phase II fieldwork was conducted during October and November 1997.

The sampling design for Chittagong and Dhaka markets consisted of a purposive sampling of important milling clusters, wholesale and retail markets followed by the random selection of millers, wholesalers and retailers within the purposively selected locations. This is summarised in Table 4.1 below:

Table 4.1: Sampling Design for Mills and Retailers in the Terminal markets

	DHAKA	CHITTAGONG
Milling Cluster	Dhamrai	Chaktai
	Kaliakoir	Pahartail
Retail Markets	Badamtali	Chawk Bazar
	Kachukhet	
	Kawran Bazar	
	Mirpur	Pahartali
	Muhammadpur	
	New Market	Reazuddin Bazar
	Savar	

From initial enquiries, the research team have found that Dhamrai in Dhaka district and Kaliakoir in Gazipur district are the two major rice milling clusters that supply rice to different rice wholesale markets in Dhaka. The Kaliakoir milling cluster also supplies rice to rice wholesalers in Chittagong[1] (see Map 4.1). In Chittagong, just two milling clusters, Chaktai and Pahartali, were found and both are included in the Phase II sample (see Map 4.2). From each milling cluster, four mills were selected at random, giving a total of 16 mills in the terminal markets.

[1] Note that Mirkadim in Munsiganj district has a greater number of mills than Dhamrai and Kaliakoir together, but was omitted from the Phase II survey because it does not supply rice directly to the Dhaka market.

Seven rice retail markets in Dhaka and three rice retail markets in Chittagong were included in the Phase II sample. Five retailers were selected at random from each of these retail markets, so that a total sample of 50 retailers was interviewed during this phase. In Dhaka, it was found that all retail markets other than Kawran Bazar, New Market and Mirpur are attached to wholesale rice markets in the same location. However, in Chittagong, only Pahartali retail market was attached to a nearby wholesale market. Since Chaktai market in Chittagong is a pure wholesale market, another retail market (Chawk Bazar) was selected which has close connection to Chaktai. The largest rice retail market in Dhaka and Chittagong is Kawran Bazar and Reazuddin Bazar respectively.

The rest of this chapter is organised as follows: findings from the millers' survey are presented in Section II. Section III discusses the evolution of wholesale rice markets in Dhaka and Chittagong. Section IV presents the findings from the retailers' survey. Section V presents a brief discussion on rice marketing channels in the terminal markets. The relationship and interaction between wholesale and retail rice price series in Dhaka and Chittagong are discussed in Section VI. The last Section discusses the summary and conclusions.

II. FINDINGS FROM THE MILLERS' SURVEY

Rice mills within the marketing chain possess many distinguishing features. Rice mills add significant value to the product by processing paddy into rice. The rice milling business is much more organised than any other operation in the rice marketing chain. It is also one of the major agricultural businesses in Bangladesh. There were slightly more than fifty thousands rice mills in Bangladesh in 1990 (Chowdhury, 1992), including automatic, major, and huller mills. Though the technology of rice processing is more or less uniform throughout Bangladesh, the nature of operation, in terms of procurement of paddy and rice sale by millers, vary between procurement and terminal markets. This section highlights the major findings from the millers' survey in the terminal markets.

Before getting into the role and importance of the mills in rice marketing, some background information about the mills in Chittagong and Dhaka will make the subsequent analysis easier to comprehend. All the mills in Chittagong (both in Chaktai and in Pahartali clusters) covered in our survey process non-parboiled (*atap*) rice. The mills in the Dhamrai cluster in Dhaka are all parboiled rice mills whereas 75percent of the rice mills in Kaliakoir cluster are parboiled mills and

the rest are non-parboiled (*atap*) mills. Since there are significant differences in the technology involved in milling non-parboiled and parboiled rice, the cost of processing paddy and the operation of the mills are also different.

The survey revealed that 68.8 percent of the mills in the sample are owner operated and 31.2 percent are rented. 45 percent of the owner-operated mills are under family ownership[2] and 55 percent under single ownership[3]. All of the owner operated mills are managed either by a family member of the owner or by a partner.

The age structure of the mills in Chittagong and Dhaka are reported in Table 4.2 which shows that approximately 44 percent of rice mills were established in the 1980's which is also true in general for the whole country. Due to favourable government policy climates during this period, many new mills were established throughout the country, the details of which are discussed below. None of the mills in the sample were bought or transferred from another owner. 87.5 percent of rice mills were built by the present owner, the rest by the present owner's father.

Table 4.2: Age Structure of the Rice Mills in Chittagong and Dhaka

Starting Date	Number of Mills	Percentage	Cumulative Percentage
1970 - 75	2	12.50	12.50
1976 - 80	3	18.75	31.25
1981 - 85	3	18.75	50
1986 - 90	4	25	75
1990 - 95	4	25	100
Total	16	100	

Source: Millers' Survey, 1997

Even though the majority of mills were newly established, many of the owners had some experiences in the rice business. Sixty percent millers surveyed had previous experiences in rice related businesses before establishing or renting rice mills. One of the millers, who now rented a

[2] Family ownership means the mill is owned jointly by more than one members of the same family.

[3] Single ownership means the mill is owned by only one person.

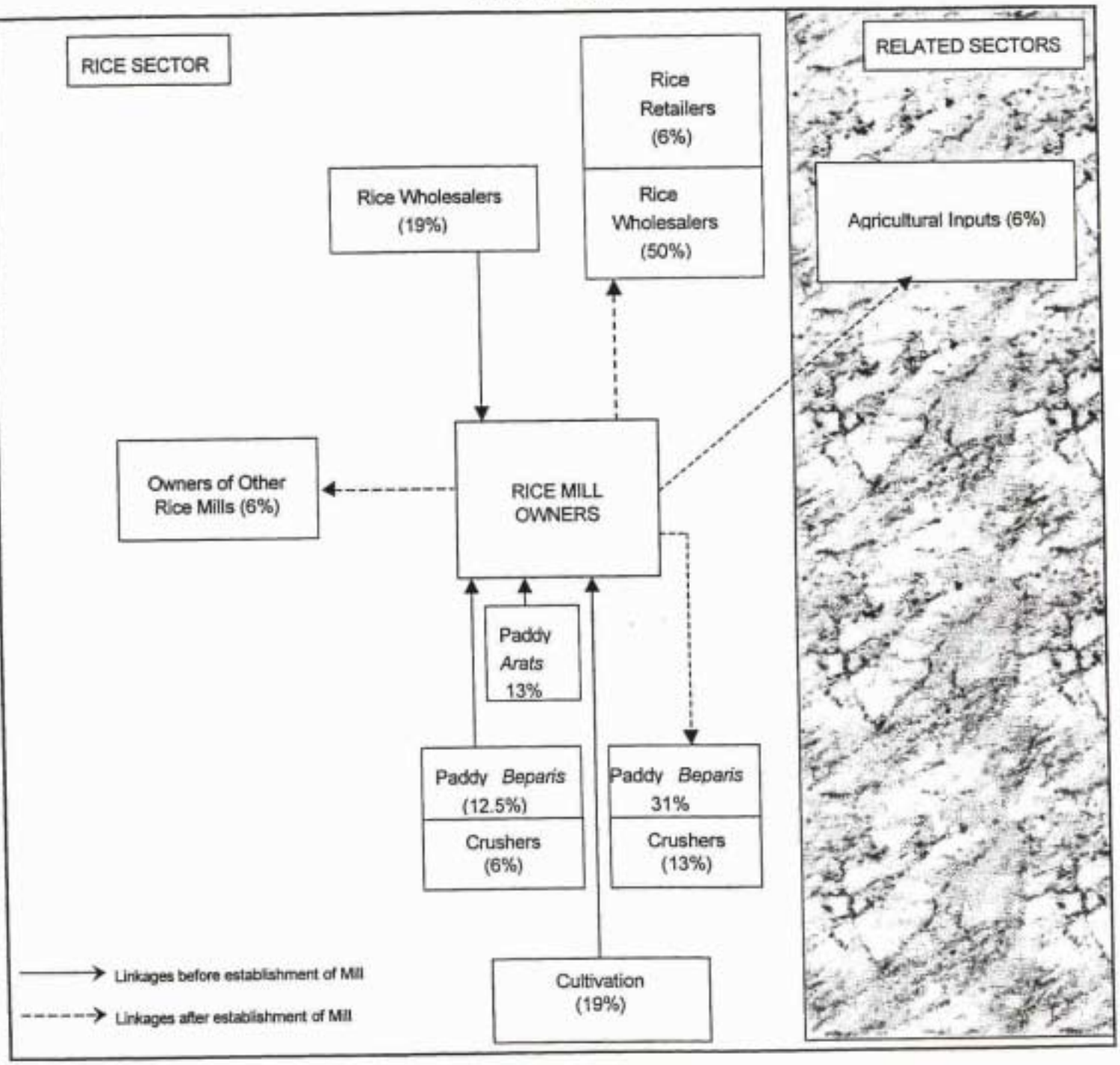
mill in Kaliakoir cluster in Dhaka, had 25 years experience in the rice milling business. The breakdown of type of agriculture related business activities before and after starting the milling businesses are explained in Figure 4.1.

Before starting the milling business, 19 percent of millers surveyed were engaged in the rice wholesaling business, 19 percent were engaged in cultivation, 13 percent had paddy *arats*, and another 12.5 percent were paddy *beparis*. Some of them were already working as crushers (6 percent) who purchase paddy on their own from procurement areas and have it processed in others' mill and then sell the rice.

Most of the millers in Dhaka (i.e., Kaliakoir and Dhamrai) were either paddy *beparis* or farmers before venturing into the milling business. Direct involvement in paddy procurement helps millers to procure paddy at lower prices and also ensures a steady supply of paddy throughout the year. Rather than depending on independent *beparis* for bringing paddy, Dhaka millers were found to send their own employees to procurement markets for direct procurement of paddy. The employees purchase paddy when prices are lowest and send it to mills. So, by consolidating these two businesses millers in Dhaka were able to obtain a higher profit margin.

In contrast, millers in Chittagong (i.e., Chaktai and Pahartali) are getting more and more involved in the rice wholesaling business. Some 25 percent of millers in Chittagong had expanded vertically into milling business from rice wholesaling business and 75 percent of millers (who previously did not have any rice wholesaling business) had opened up rice wholesaling shops within 1 to 2 years of starting their milling business. The advantage of their operating a rice wholesale outlet is to provide crushers and *beparis*, most of who procure paddy from North Bengal, an additional service. Furthermore, since most mills in Chittagong operate on a commission basis and are located near to the rice wholesaling centres, by providing this service to independent *beparis*, Chittagong millers were able to increase their throughput and revenues.

Figure 4.1: Vertical, Horizontal and Diagonal Expansion of Mills Before and After Establishment



From Figure 4.1 it can be seen that 50 percent of all the millers surveyed (i.e., all the millers in Chittagong, since half of the sample mills were drawn from Chittagong) had set up their own rice wholesaling business. And 31 percent of all the millers started paddy *bepari* business. Overall a significant amount of vertical expansion and consolidation were found in the terminal markets - between millers and paddy *beparis* in Dhaka and between millers and rice wholesalers in Chittagong.

Market Linkages of Mills

Mills in Chittagong show slightly different patterns of market linkages from mills in Dhaka. Even though similar patterns of backward linkages were found to exist between millers and paddy *aratdars* both in Chittagong and Dhaka, the forward linkages of mills with the rice wholesalers differ in Chittagong from Dhaka. On average, each mill in Chittagong and Dhaka is linked with 4 different paddy assembly markets. Within each of these paddy assembly markets, each mill purchases from 3 different paddy *aratdars*. In Chittagong, each mill was found to link with only one local wholesale market (either Chaktai or Pahartali) and within that market they sell rice to 15 different wholesalers, on average. But each mill in Dhaka area is linked with an average of three different rice wholesale markets and sells rice to 3 to 5 different wholesalers within each wholesale market.

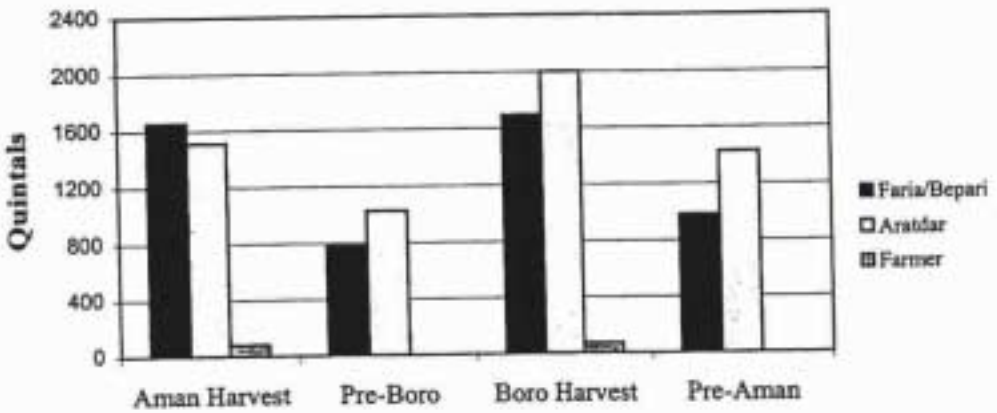
Seasonal Features in Paddy Procurement and Rice Sale

The millers' survey has identified three specific links through which millers in terminal markets procure paddy - from paddy *arats*, from independent *farias/beparis*, and directly from farmers. Procurement of paddy by millers showed considerable seasonal variation. Figure 4.2 shows average procurement of paddy by millers in terminal markets from different agents and by seasons for the period from 1996 *aman* to 1997 *boro* harvest. A few interesting trends are worthy of discussion here. First, data shows that millers procured very little paddy directly from farmers. However, this is not representative of mills in procurement areas because millers in Chittagong and Dhaka are far removed from the paddy production centres in the country.

Secondly, millers in Chittagong and Dhaka procure, on average, 40 to 50 percent of paddy (in all four seasons) from independent *farias* and *beparis*. The lowest procurement (in quintals) from *farias* and *beparis* was in pre-boro lean period and the highest procurement from *farias* and *beparis* was in *boro* season. They procure on average 46 to 60 percent of paddy (in all four seasons) from the paddy *arats*, the lowest (in quintals) in pre-*boro* season and the highest in *boro* harvest period. These two findings indicate that paddy *arats* and *farias/beparis* are the principal sources of paddy procurement.

Finally, millers' procurement after the *boro* harvest is higher than the procurement after the *aman* harvest. The average pre-*aman* procurement of paddy by millers is higher than the average pre-*boro* procurement because *aus* is harvested at this time of the year (August/ September).

Figure 4.2 Millers' Seasonal Paddy Procurement (100 kg)

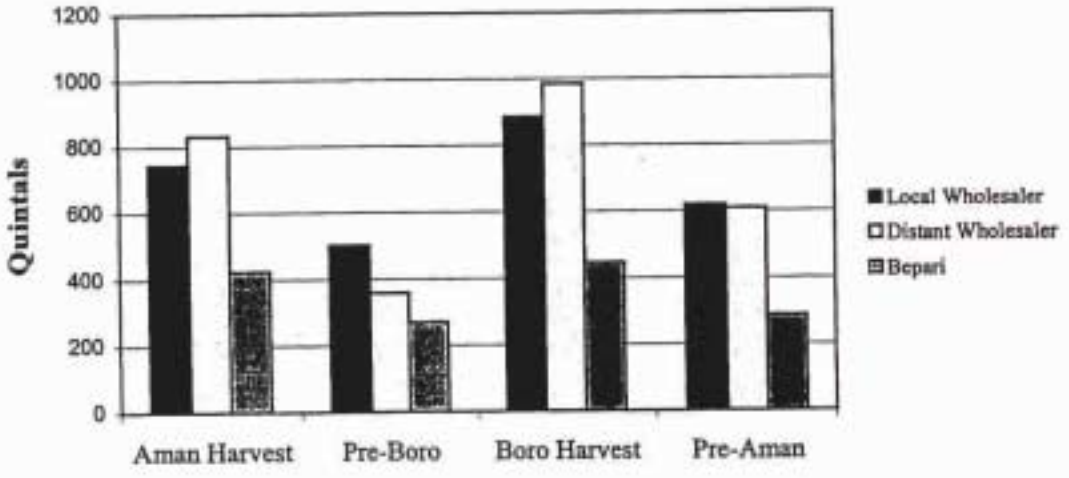


The sampled millers in Chittagong and Dhaka sold their rice either to wholesalers (both local and long distance) or to independent *beparis*. One would have expected that millers would try to avoid wholesalers for selling rice because wholesalers charge a commission for selling millers' rice. And these commission payments reduce the millers' margin. However, as Figure 4.3 shows, it was found that on average 75 to 80 percent of the milled rice was sold to wholesalers (including local as well as distant) and the rest to independent *beparis*. This may be due to two factors. First, all sampled millers in Chittagong have their own rice wholesale shops, and naturally these millers sell the lion's share of their rice through their own wholesale shops. The second factor that may lead to such evidence of higher rice sale through the rice wholesalers is that millers in Dhaka usually sell their rice mainly to wholesalers in the new rice wholesale markets such as Muhamadpur, Kachukhet, Badda, etc. The wholesalers in these new wholesale markets transact less of their business on

commission and more on their own. So, millers in Dhaka sold their rice to these wholesalers and did not have to pay commission.

Average rice sales by millers, captured in Figure 4.3, show a similar seasonal pattern as paddy procurement. Average rice sales in *boro* season is higher than that in *aman* season and pre-*aman* rice sale is higher than pre-*boro* rice sale. Comparing Figures 4.2 and 4.3, it seems that millers did not store paddy for speculative purposes (note that processing 100 kilograms of paddy produces roughly around 64 kilograms of rice). They sold all their rice after processing in the same season. So no inter-seasonal speculative storage was captured in our sample[4].

Figure 4.3 Millers' Seasonal Rice Sales (100 kg)



Forward and Backward Credit Linkages of Millers

Millers in Chittagong and Dhaka procure most of their required paddy from three different sources - paddy *aratdars*, *farias/beparis*, and farmers. The volume of trade between any of these three agents and millers is influenced by the trade credit availability from paddy seller and credit worthiness of miller. A particular type of trade credit arrangement may explicitly influence

[4] The storage behavior within a particular crop season was not investigated in our study.

Table 4.3: Seasonality of Different Types of Financial Contracts for Procuring Paddy by Millers (% of millers who used a particular contract)

	Procurement from Farmer		Procurement from *Faria/Bepari*		Procurement from *Aratdar*	
Types of Contracts	Percentage	Top 2 Seasons	Percentage	Top 2 Seasons	Percentage	Top 2 Seasons
100% Cash	12.5	*Aman* *Boro*	37.5	Pre *Aman* Pre *Boro*	43.8	Pre *Aman* Pre *Boro*
100% Deferred Payment	0	n.a.	18.8	All Seasons	37.5	Pre *Aman* Pre *Boro*
Mix of Cash and deferred Payment	0	n.a.	75	*Aman* *Boro*	100	*Aman* *Boro*

Notes: The data covers 1996 *aman* to 1997 *boro* period. n.a. means not applicable.
Source: Millers' Survey, 1997

the transaction price. For example, if millers purchase paddy on a cash basis, they get a price discount. Three types of financial contracts have been used by millers for paddy procurement - 100 percent cash, 100 percent deferred payment, and mix of cash and deferred payment. The summary results are provided in Table 4.3. It should be noted that the percentage columns do not add to 100 because millers often use different types of contract at the same time and sometimes millers do not use every type of alternative contract. Also the percentage figures in rows do not add to 100 because they apply to different agents.

One hundred percent cash purchase of paddy by millers is relatively rare. Only 12.5 percent of millers surveyed in Chittagong and Dhaka procured paddy from farmers. Paddy procurement from farmers was limited to *aman* and *boro* harvesting periods only. 37.5 percent of millers purchased paddy in cash from the *farias/beparis* and 43.8 percent of millers purchased paddy in cash from paddy *aratdars*. But interestingly cash purchases from *farias/beparis* and *aratdars* are observed only in lean periods before harvesting of the two main rice crops. This supports the hypothesis that cash and credit transaction depends primarily on availability of paddy at the time of transaction. However, cash purchases from *farias/beparis* and *aratdars* were found to decrease over time.

Similarly, 100 percent credit purchase (which actually is deferred payment) is also rare. Millers did not get any deferred payment from farmers whereas 18.8 percent of millers got 100 percent deferred payment from *farias/beparis*, and 37.5 percent of millers got this facility from *aratdars*. And

availability of 100 percent deferred payment from *farias/beparis* and paddy *aratdars* were found to be increasing.

The most frequent trade credit arrangement is a mixture of cash and credit. Millers pay for a certain portion of paddy consignment in cash at the time of delivery and then pay the rest after they sell the milled rice or at the time of next paddy purchase, normally whichever is earlier. Seventy five percent of millers have used this kind of financial arrangement for purchasing paddy from *farias/beparis* and all millers have used mix of cash and credit arrangement for purchasing paddy from *aratdars*. However, millers indicate that *farias/beparis* are increasingly demanding more cash relative to deferred payment. On the other hand, *aratdars* are willing to provide even more deferred payment relative to cash.

The major picture that emerges is that millers engage in financial contract which uses a mix of cash and credit in *aman* and *boro* harvesting period; but in the pre-harvest lean periods, they get either 100 percent credit or purchase paddy by paying 100 percent cash depending on the availability of paddy. Evidence of *dadon* by millers was not found in the survey.

Millers in Chittagong and Dhaka sell their rice mainly to local and long-distance wholesalers, and to independent *beparis*. Three different types of financial contracts between millers and buyers are observed - 100 percent cash sale, 100 percent credit sale, and mix of cash and credit sale. These millers did not receive any advance from any buyer groups for guaranteed rice supply. Table 4.4 reports the basic findings. It should be noted that the percentage columns do not add to 100 because millers often use different types of contract at the same time and sometimes millers do not use every type of alternative contract. Also the percentage figures in rows do not add to 100 because they apply to different agents.

All the millers surveyed in Dhaka and Chittagong sold rice to independent *beparis* on 100 percent cash basis but this type of sale was limited mainly to lean periods and incidence of this type of arrangement is declining over the last few years. Some 44 percent millers surveyed reported that they sold rice to the *beparis* on 100 percent credit (in all seasons). Some 69 percent millers surveyed sold rice to *beparis* on mix of cash and credit; however, this type of financial contract was limited to harvesting periods only, even though the trend of this type of arrangements are increasing.

Table 4.4: Seasonality of Different Types of Financial Contracts for Selling Rice by Millers (% of millers who used a particular contract)

	Sale to *Beparis*		Sale to Local Wholesalers		Sale to Long Distance Wholesalers	
Types of Contracts	Percentage	Top 2 Seasons	Percentage	Top 2 Seasons	Percentage	Top 2 Seasons
100% Cash	100	Pre *Boro* Pre *Aman*	25.5	All Seasons	0	n.a.
100% Deferred Payment	43.8	All Seasons	50	All Seasons	43.8	All Seasons
Mix of Cash and Deferred Payment	68.8	*Aman* *Boro*	50	All Seasons	50	All Seasons

Notes: The data covers 1996 *aman* to 1997 *boro* period. n.a. means not applicable.
Source: Millers' Survey, 1997

Regarding sales to local rice wholesalers, 25 percent millers surveyed reported selling rice on 100 percent cash, and 50 percent millers surveyed sold rice on 100 percent deferred payments. Half of the millers surveyed reported that they used some mixture of cash and credit arrangement for selling rice throughout the year. But cash sales of rice to local wholesalers are declining whereas sales involving any credit are increasing. Millers in Chittagong and Dhaka do not sell any rice against 100 percent cash to long-distance wholesalers. Almost half of the millers surveyed sold rice to long-distance wholesalers against some credit throughout the year.

The discussion regarding the types, seasonality and trend of financial contracts between millers and other agents in rice marketing chain (Tables 4.3 and 4.4) display some interesting features. For example, millers receive credit advances from *farias*, paddy *beparis*, and paddy *aratdars* and make credit advances to rice *beparis*, and rice wholesalers. This circularity of trade credit flow is not a special case for millers but observed in each level of the rice marketing chain in Bangladesh. Availability of trade credit promotes linkages between pairs of agents and often influences the transaction price. Also the speed at which paddy or rice moves from one tier to another in the marketing chain depends, *inter alia*, on trade credit availability and the type of contracts concluded between different tiers of marketing chain. For example, some retailers in the sample reported that they could not purchase rice directly from millers because millers did not provide any credit to them. The financial contracts that are observed in the rice market in Bangladesh are often verbal and rely more on the personal relationships and mutual trusts than anything else.

Bargaining power of one agent in settling financial contracts depends mainly on availability of rice at the time of transaction. If production fails, relative bargaining power shifts in favour of the agents higher up the marketing chain i.e., closer to farmers. Conversely, relative bargaining power shifts down the marketing chain when production is bountiful. The value of a good rises with the scarcity of the good; hence with short supply not only the price rises but also the underlying credit contracts between agents also change.

Sources and Receivers of Trade Credit

In the Phase II survey, the direction and terms of trade credit flows from one tier to another in the rice market in Bangladesh have been investigated. And it was possible to present a picture of direction of credit flows upward and downward in the rice marketing chain and how that is changing over last few years. However, it was not possible to investigate the volume of trade credit received and disbursed by each and every agent in the rice marketing network in Bangladesh. Nevertheless, the issue of the principal sources and receivers of trade credit remains an important point in any structure conduct and performance study of rice market as it indicates, among other things, the relative power of one group of agents compared to other groups. So, available secondary data have been used to deduce the principal sources and receiver of trade credit in the rice marketing chain in Bangladesh. Chowdhury (1992) has provided detailed information on such data that was collected during 1989/90. The analysis that follows in this section is solely based on that data.

From Table 4.5, it can be verified that the top three credit receivers, in descending order, are rice *aratdars*, paddy *aratdars*, and millers. The principal sources of credit providers for each of the receivers and their corresponding percentage figures are also provided in Table 4.5. Using the same dataset, principal credit sources and their respective shares of credit were also calculated as shown in Table 4.6. *Beparis*, *aratdars*, and millers are the top three sources of credit.

From Tables 4.5 and 4.6, it can be verified that *beparis* are the most powerful group who are the source of 52 percent of the total credit advanced. Millers occupy a place both in the top three important sources of credit and top three receivers of credit. Millers receive 19.1 percent of credit mainly from paddy *aratdars* and disburse 8.55 percent of credit mainly to rice *aratdars*. So, overall they are net credit receivers. This may also be true for some other agent(s) in the rice marketing chain. The important thing to notice here is the circularity of credit flow in the rice market in

Bangladesh. Same agent gives and receives credit. But, whether a person is a net credit provider or receiver depends largely on the production.

Table 4.5: Trade Credit Received by Different Agents and Sources of Such Credit

Type of Agents Receiving Credit	Percentage of Credit Received	2 Most Important Sources of Credit	
		Name of Agents	% of Total Credit Provided
Paddy Traders	2.2	Farmer	45
		Paddy *Aratdar*	30
Paddy *Aratdars*	21.4	*Bepari*	88
		Farmer	5.3
Rice Mills	19.1	Paddy *Aratdar*	56.7
		Bepari	29.3
Crushers	11.8	*Aratdar*	70
		Bepari	21
Rice *Aratdars*	35.3	*Bepari*	55.3
		Miller	21.1
Rice Retailers	0.5	*Aratdar*	38.5
		Kutial	20.8
Others	9.7	N.C.	N.C.
		N.C.	N.C.

N.C. means not calculated. Others include *Kutials*, rice wholesalers, etc.
Source: Chowdhury (1992), page 154.

Chowdhury (1992), in his study (from where the above data is drawn), commented that "*the fact that the farmer should be a prominent source of credit for the paddy itinerant merchants, and at a further remove, for wholesalers is intuitively suggestive of growing solvency of the farmers in Bangladesh.*" He found that 45 percent of the credit advances received by paddy traders is disbursed by the farmers. But the strong conclusion of farmers becoming solvent seems to be a moot point if we note that paddy trader is the receiver of only 2.2 percent of the total credit (see Table 4.5) and farmers are source of only 6 percent of total credit disbursed (see Table 4.6).

Table 4.6: Major Sources of Trade Credits in Rice Market in Bangladesh

Sources of Credit	% of Total Credit Advanced
Paiker	0.32
Bepari	51.94
Faria	3.12
Crusher	6.44
Kutial	1.46
Farmer	5.98
Aratdar	21.75
Miller	8.55
Retailer	0.03
Others	0.41
Total	100

Source: Chowdhury (1992), page 154.

Storage and Milling Capacity

From the field survey it was found that millers in Chittagong and Dhaka do not store significant amount of paddy in harvesting periods for speculative gain later in lean seasons. The majority of the sampled millers also deny that they store any paddy for smooth operation of the mills in lean periods. Also comparing the seasonal paddy procurements and rice sales by these millers, it can be checked that millers do not procure additional paddy for inter-seasonal storage. Average storage capacity of the mills for 4 different time periods are reported in Table 4.7. This Table shows that average storage capacity increases almost 49 percent over the 14 years period from 1983 to 1997. But the current average capacity of 903 quintals of paddy does not seem to indicate that millers store any paddy for speculation.

Table 4.7: Average Storage Capacity of the Mills in Operation (100 kg)

Year	1983	1988	1992	1997
Mills in Operation	8	9	15	16
Storage Capacity	607	767	804	903

Source: Millers' Survey, 1997

The average storing period of rice by millers across different seasons is reported in Table 4.8. Millers do not store rice for long periods, the average time being only 3 to 4 days.

Table 4.8: Average Storage Periods of Rice by Seasons

	Period (Days)			
	Aman	Pre *Boro*	*Boro*	Pre *Aman*
Maximum Period	11	8	9	7
Minimum Period	2	2	2	2
Average Period	4	3	3	3

Source: Millers' Survey, 1997

On average, mills in Chittagong and Dhaka operate 12 hours daily during the peak harvest periods and each mill husk on average 142 quintals of paddy in 12 hours. During the peak *aman* and *boro* harvesting periods, each miller on average procured 3249 quintals and 3762 quintals of paddy respectively. So at the rate of 142 quintals per 12 hour, they could have husked all the *aman* paddy in 23 working days and all the *boro* paddy in 27 working days. In the survey, the *aman* period was specified as 90 days and *boro* period was specified as 75 days. So one can sense a good deal of unused capacity in mills in the terminal markets even in *aman* season when average rainfall is very low and the paddy drying processes after parboiling do not get delayed due to rain. The unused capacity in the lean periods will even be higher than that in the harvest periods. In the *boro* season (rainy season), drying of paddy often takes 2 to 3 days due to lack of Sunlight. In the *aman* season, there usually is no problem of rain but fog and fewer hours of daylight often delay the drying of paddy. Once these are factored into the calculation, the above-mentioned unused capacity in the mills seems to be not that excessive.

To understand why and how excess capacity in rice mills was built up, one needs to look at the Government policies regarding millgate procurements and Government milling contracts that are given out to the mills. The Government under President Ziaur Rahman started contracting out the procured paddy to mills for processing during his tenure in the late 1970s and early 1980s. (Also the Bangladesh Government used to procure rice directly from millgates in procurement areas for building annual buffer stock.) Millers used to sell out the good quality paddy supplied to them by the Government elsewhere and send back the low quality rice to the government godowns. So, milling business was quite profitable in terms of earning almost secured profits. So, many rice mills were established during that period throughout the country, in general, and Kaliakoir, in particular. Later when the Government suspended the millgate procurement and crushing contracts, the dreams of many millers had been shattered. Some went out of business; but many of these mills are still in operation, operating at a less than full capacity. So, the building up of excess milling capacity in Bangladesh should not be considered as any strategic move by millers to deter new entries.

Millers' Margin

Table 4.9 presents the millers' margins in *aman* and *boro* seasons that show that the margin of processing 100 kg of *aman* paddy (i.e., *BR-11* and *Najirshail*) is higher than processing the same amount of *boro* paddy (*IRRI*, *HYV Gaji*, and *Najirshail*). On average, millers get Taka 10 more by processing one quintal of *aman* paddy.

Table 4.9: Millers' Average Margin in Chittagong and Dhaka (Taka / 100 kg Paddy)

Variety	*Aman*	*Boro*
Average Margin	38	28

Source: Millers' Survey, 1997

Vertical Integration Between Millers and Wholesalers

The most interesting finding in Chittagong rice market is that many existing rice wholesalers in Chaktai have set up rice mills and on the other side many existing millers have opened up rice wholesaling businesses in Chaktai. This vertical consolidation between rice wholesalers and millers in Chaktai may indicate market power of these wholesaler-cum-millers, because Chaktai is the biggest rice wholesaling centre and also the biggest rice milling cluster in Chittagong. However, the

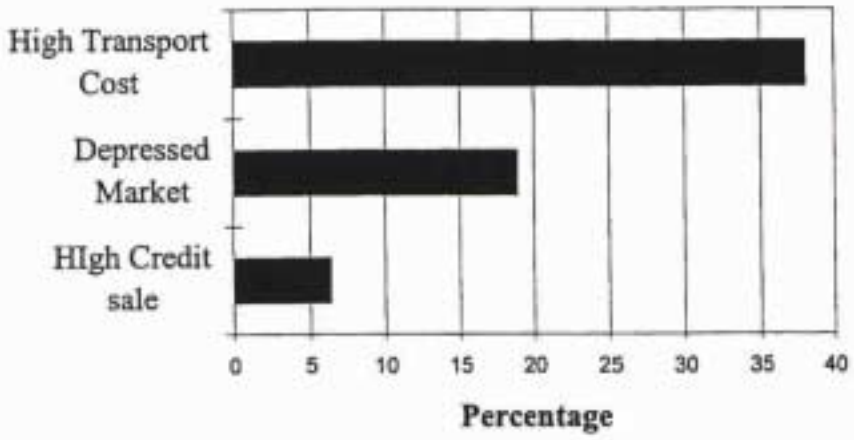
survey did not reveal any indication of such consolidation between rice millers and rice wholesalers in Dhaka.

In Chittagong, paddy *beparis* bring paddy mainly from Comilla, Haluaghat, Jamalpur, and Sherpur to the mills in Chaktai. Millers pay 40-50 percent of the consignment to *beparis* when *beparis* bring paddy and then sell the milled rice mainly through their own wholesale shops and pay the rest. They charge *beparis* 20 Taka per maunds (37.324 kg) of rice as a processing fee. Millers do not charge any commission for selling *beparis'* rice (wholesaling commission charge is 5 Taka per maund of rice at Chaktai). Millers provide this service to *beparis* as an incentive to ensure steady supply of paddy in their mills. Wholesalers (who also own mills) also sell rice brought by rice *beparis* from North and North-western districts and charge 5 Taka per maund of rice as commission. Wholesalers in Chaktai sell both locally milled rice and rice procured from north and North-western Bangladesh. The composition of rice sold by wholesalers in Chittagong is - 30 percent locally milled rice, and 70 percent North Bengal rice.

Problems and Constraints of Millers

Millers have reported their problems that were constraining their business and the details are shown in Figure 4.4 below. Some 38 percent of millers reported that due to high transport costs they sometimes could not purchase paddy from long distance paddy markets and that lack of paddy, particularly in the lean seasons, often forces them to operate at less than full capacity. The increased transportation costs often makes the rice/paddy price ratio unfavourable for millers in the terminal markets and forces them to halt the processing. The second most important problem for them was depressed rice markets in the country - the rice prices in real terms were falling in the markets for the last few years constantly pressing on the profit margin. One-fifth (18.8 percent) of the sampled millers reported this as a major problem. Another 6.25 percent of rice millers reported that the credit sale of rice had increased lately to such an extent that many millers had applied for C.C. (Commercial Credit) loan from commercial banks to extend their working capital. They have also mentioned numerous other problems such as shortages of cash and credit, chadabazi, lack of T.T. (Telegraphic Transfer) facility, and low profit margins in the milling business.

Figure 4.4: Problems of Millers



III. EVOLUTION OF THE RICE WHOLESALE MARKETS IN TERMINAL MARKETS

This section reports the findings from the Wholesalers' survey conducted in Phase II of the study. The findings are based on key informants' survey conducted during November and December of 1997. From Phase I of the study it was revealed that the role and importance of Badamtali wholesale rice market in Dhaka is declining, and new wholesale rice markets are being established in the urban peripheries of Dhaka city. The major thrust in Phase II wholesalers' survey was therefore to investigate the reasons behind such a process.

In Dhaka, the most important rice wholesale market was and still is Badamtali wholesale market in the heart of Old Dhaka. However, the prominence and the volume of rice traded in this market has been declining in the recent years. Simultaneously, new wholesale rice markets are being set up in other parts of the city. A similar process has been happening, though to a lesser extent, in Chaktai and Pahartali in Chittagong. The reasons behind this trend, and its impact on the overall rice marketing chain will now be discussed on a case by case basis.

Decline of Badamtali Rice Wholesale Market

Recent trends of emergence of new wholesaling centres in and around Dhaka metropolitan city over the last ten years deserve special attention. Badamtali rice wholesale market, located on the

Northern part of the old Dhaka city by the river Buriganga, was traditionally the nerve centre of Dhaka as well as the national rice market (Ravallion, 1987). Even though Badamtoli was established originally on the periphery of Dhaka city, it has since been engulfed by the city's rapid expansion. Traffic congestion in and around Badamtali was then worsened by the construction of the bridge over the river Buriganga that has made the approach road to Badamtali almost unapproachable by truck.[5] Furthermore, bags of rice now have to be carried to the market place by the porters, increasing further the transfer costs and depleting the margins of the rice traders. As a consequence of this congestion, a truckload of rice from North Bengal now costs Taka 500 to Taka 1000 more to reach Badamtali than other outlying parts of Dhaka. As a consequence, over the last ten years, many traders (both rice and others) have shifted their premises to other parts of the city.

The rice wholesalers still operating in Badamtali are mainly commissioned agents. They sell rice brought to them by rice *beparis* on a fixed commission basis, mostly to small-scale wholesalers, retailers and other *beparis*. For their service they charge 10 paisa per kilogram of coarse rice and 20 paisa per kilogram of fine variety rice both to the *beparis* bringing the rice and those who are buying from them. However, it is important to appreciate that the commissioned wholesalers do not own the rice at any point of the transaction. It should also be noted that Badamtali used to act as a funnel for multidirectional trade - procuring rice from mainly the North and North-western districts of the country and sell to East and South. But this role is also in decline since the direct marketing of rice between the surplus Northern districts and terminal markets elsewhere in the country are gearing up, in part due to better transportation and communications infrastructures.

New Rice Wholesale Markets in Dhaka

Since rice mainly comes into Dhaka city from the North, many of the displaced Badamtoli wholesalers as well as the new businessmen have established new trading premises in and around the Northern belts of the Dhaka city. Examples of these emergent rice markets include Muhammedpur, Kachukhet, Mirpur and Badda, together with Jatrabari in the south-eastern belt area of Dhaka city.

After Badamtali, the most prominent wholesale rice market in Dhaka is Muhammadpur *Krishi* (agricultural) market that is very close to two large residential areas, Muhammadpur and

[5] The construction of this bridge also displaced some 50 (Jaim et al., 1997) merchants, as the Government of Bangladesh had acquired the land on which these premises were located for the construction of the nothern sliproad to bridge.

Dhanmondi. This market was originally built for fruit and vegetable wholesaling but the wholesalers who were allocated premises soon rented them out to the rice wholesalers. As a consequence Muhammadpur *Krishi* market became a major rice wholesaling market. The main advantage of this market is its prime location. It has good access roads, enabling its wholesalers to procure rice directly from Dinajpur, Naogaon, and Sherpur. Most wholesalers in this market sell their rice to the retailers in the Muhammadpur Town Hall market and nearby Kawran Bazar.

Badda rice wholesale market was set up in mid 1980s on the Northern fringe of Dhaka city but business only started to gear up there after a new highway was built in 1986. In 1985, there was just one rice wholesaler operating in Badda, but now there are more than 15 rice wholesalers operating from this market. The main distinguishing feature of this market is that there is no specific area in which rice trading takes place. Instead, Badda wholesalers are found scattered over an area of half a mile along the sides of highway. They usually procure rice directly from North and North-west Bangladesh and only rarely go to Badamtali to procure supplies. Unlike Batamtoli traders, wholesalers in Badda trade rice on their own account as well on a commission basis. Their principal source of demand is local retailers, who are scattered in and around the Badda area.

Kachukhet rice wholesale market was established in 1980. Originally, its wholesalers used to procure their rice from either Badamtali or Muhammadpur *Krishi* market but after five to six years, direct trading links were established with wholesalers in North and North-west Bangladesh. Since 1987 onwards, Kachukhet wholesalers do not go to Badamtali for procuring rice. So, the market was able to shed its early identity as a Badamtali dependent market and became an independent wholesale market. There are now 50 to 60 wholesalers operating in this market, who are catering to the demands of the retailers located not only in Kachukhet area itself but also in Gulshan, Kaprul, Ibrahimpur, Mahakhali and Mirpur.

Finally, Mirpur (Section I) wholesale rice market, which is located in the main commercial area around Mirpur, is older than either the Badda or Kachukhet wholesale markets. This market was established with only two wholesalers a few years after the liberation of Bangladesh in 1975. Now there are at least 60 rice wholesalers operating in the market. Its wholesalers procure rice directly from Sherpur, Mymensingh and Jamalpur, and they sell rice to retailers in the Mirpur, Kalyanpur, and Kachukhet parts of Greater Dhaka.

Box 4.1 Evolution of Jatrabari Rice Wholesale Market

The newest rice wholesale market in Dhaka is Jatrabari rice wholesale market. It started with only two or three *arats* after the grain market liberalization in 1992 but the business started to gear up from 1995 and by 1997 total number of *arats* reaches 32. From the survey teams discussions with key informants, the following factors are identified which have been instrumental in the downhill journey of Badamtali wholesale market and the uphill journey of the other markets.

Traffic jams and other congestion in and around Badamtali market due to the construction of the bridge over river Buriganga has made the approach road to Badamtali almost unpassable. A truckload of rice from North-West Bengal costs at least Taka 500 to Taka 1000 more to reach Badamtali compared to other wholesale markets in Dhaka. Hence, the *beparis* who have to pay these additional transportation costs were eager to make contacts with other wholesaling areas of the city. So, right after the removal of the trade licensing in the rice business, the displaced aratdars at Badamtali, some of the employees of the arats in Badamtali, and new businessmen started to set up wholesaling businesses elsewhere in Dhaka city. For example, almost 90 percent of the present *aratdars* in Jatrabari were involved in rice wholesaling in one or other capacity in the *arats* in Badamtali.

The *aratdars* in these new wholesale markets can offer a better price to the rice *beparis* who are bringing rice from other parts of the country as compared to price offered by the Badamtali *aratdars*. When asked what exactly made that possible, the *aratdars* in Jatrabari said that the lower transportation cost from Jatrabari to other parts of the city (as compared to Badamtali) made it profitable for the retailers to purchase rice from the newly developed wholesale markets such as Jatrabari. Not only is the transport cost lower, but the time involved in travelling to and from Badamtali to procure few bags of rice often takes good part of the day. This is very inconvenient for the retailers. Hence the retailers are willing to pay a few taka more per bag of rice to avoid Badamtali. Since most of these wholesalers operates on commission, the better prices actually benefit the *beparis* who bring the rice to the wholesaling centers. Hence the lower transportation cost and higher price of rice give the new wholesaling centers a competitive advantage vis-a-vis to Badamtali.

Decentralisation of the Chittagong Rice Wholesale Market

The decentralisation in Chittagong rice wholesale market is also taking place but to a lesser extent than the Dhaka rice wholesale market. New rice wholesale markets have been established in Aturar Dope, Kamal Bazar, Yasin Hat, and Karnafully. The basic reasons for opening up of these new markets are same as those in Dhaka market but the number of *arats* in these new wholesale markets are far less than the new wholesale markets in Dhaka, on average 5-10 wholesale shops in one market. The main distinction between new wholesale markets in Chittagong and Dhaka is that the wholesalers in new wholesale markets in Chittagong procure rice either from Chaktai or from Pahartali. But the wholesalers in new wholesale markets in Dhaka procure rice directly from the procurement areas. So, new wholesale markets in Dhaka are competing against Badamtali whereas the new wholesale markets in Chittagong are actually supporting Chaktai and Pahartali wholesale markets.

IV. FINDINGS FROM THE RETAILERS' SURVEY

The rice retailers' survey in Dhaka and Chittagong provide many interesting evidences regarding the marketing of rice in Bangladesh (note that all the retailers in our sample are pure rice retailers). Retail businesses of rice have been everywhere in Bangladesh all the time since rice is the main cereal food that the majority of the Bangladeshi people consume on daily basis. But, looking at the age structure of the retail shops (Table 4.10), it was revealed that 78 percent of shops were came into operation from 1971 - 1990. And only 4 percent of the shops were established in between 1951-1970.

Table 4.10: Age Structure of the Retail Firms

Date of Start	Percentage	Cumulative Percentage
1941 – 45	4	4
1946 – 50	10	14
1951 – 55	2	16
1956 – 60	0	16
1961 – 65	0	16
1966 – 70	2	18
1971 - 75	2	20
1976 - 80	22	42
1981 - 85	16	58
1986 - 90	38	96
1991 - 95	4	100

Source: Retailers' Survey, 1997

The reason behind this young age structure may be that during the 1970s and 1980s rice retailing was more lucrative compared to 1950s and 1960s. The survey also revealed that almost 50 percent of the firms which opened up their shops in 1980s was actually bought from someone else - indicating a lot of turmoil in the rice retailing business in those years. As per the background of these retailers, it is found that only 28 percent of retailers had some previous experience in the rice business. And 28 percent of retailers stated they were unemployed before setting up these firms. So, unemployment might be another reason why so many firms were set up during 1970s and 1980s. Also, marketable surplus of rice was increased to a large extent necessitating more agents in each of the nodes of the marketing chain. All these factors might have been crucial in the unusual growth of the rice retail firms in Dhaka and Chittagong during 1970s and 1980s.

Structure of Retail Rice Sale

The average rice sales by retailers in the sample by variety are reported in Table 4.11. HYV varieties of *aman*, *boro*, and *aus* constitute 64 percent of the total rice sale. None of the retailers were found to sell any imported rice. One interesting thing to note here is that *aman* becomes the largest single variety of rice sold when we add up all three different varieties of *aman* - fine,

medium, and HYV. But at the same time it should be noted that this finding might be very specific to Dhaka and Chittagong markets.

Table 4.11: Composition of Rice Sale by Retailers

Variety	Superfine	Fine *Aman*	Medium *Aman*	Coarse HYV *Aman*	*Boro/Aus* HYV	Imported Medium
Average (%)	02	14	20	29	35	0

Source: Retailers' Survey, 1997

Note: The data was collected in October, November in 1997.

Since per capita incomes in Dhaka and Chittagong are much higher than the national average, it is to be expected that the consumers in Dhaka and Chittagong consume more high quality rice compared to consumers elsewhere. This is also reflected from our field survey - in the selected terminal markets, sale of "fine *aman*" has increased whereas sale of "medium *aman*" has dropped over the last five years (the actual figures for this increase or drop was not provided). The survey also provided information on the two most popular varieties of rice sold by retailers. All the retailers sell BR-11 in *aman* season and IRRI in *boro* season. BR-11 is one of the most common coarse varieties of rice grown in *aman* season whereas IRRI is one of the most common coarse varieties of rice grown in *boro* season.

Table 4.12 presents retailers' average margin for the most dominant varieties of rice in the *aman* and *boro* seasons. The retailers' margin for IRRI-*boro* rice was slightly higher than that of BR-11 *aman* rice.

Table 4.12: Retailers' Average Margin in Chittagong and Dhaka (Taka / 100 Kg.)

Season	*Aman*	*Boro*
Dominant Variety	BR-11	IRRI
Average Margin	48.60	49.67

Source: Retailers' Survey, 1997

Vertical Integration between Retailers and millers in the Terminal Markets

Only a few retailers (12 percent) in the sample were found to procure rice directly from mills. All of these retailers are either from New Market or from Muhammadpur Town Hall Market in Dhaka.

Some retailers in these two markets make a group and go to mills in Dhamrai/Savar area for procuring a particular quality of rice, called *Najirshail*. But retailers usually go there only during the time of crises. Hence, this evidence of direct marketing between the retailers and the millers should not be taken as a regular feature in the terminal markets. The basic reason for retailers not procuring rice directly from mills on regular basis is that they would not get rice in credit from millers.

Price Transmission and Trade Credit Arrangement between Retailers and Wholesalers

When asked, retailers reported that they take on average two and half days to adjust their retail prices upwards when prices of rice rise in the wholesale market whereas they take on average four days to adjust their prices downward when the wholesale prices decline. This comparative downward inflexibility/rigidity of prices is not uncommon since consumers are unlikely to keep up-to-date information on wholesale rice prices and retailers also do not want to make losses when selling stocks previously purchased at higher prices.

All (100 percent) retailers procure rice on credit from wholesalers. Retailers have to pay 5 percent to 25 percent of a consignment (*chalan*) at the time of the purchase, the average being 9.3 percent. The amount of downpayment depends on past reputation of retailers' in paying due bills, overall supply of rice in the country (production), and the proximity of a retail shop to the wholesaler's shop. The most common practice of repayment is by instalments. Either wholesalers' employee will come to retailers to collect the instalment after an agreed interval or retailer, himself, will pay the instalment. The periodicity of repaying instalments varies from daily to once in 2 weeks, but the most prevalent practices are "twice in a week" and "once in 2 weeks." Twenty two percent of retailers surveyed reported that they had to clear the "last consignment" before next purchase. Normally there are some roll-overs of credit from each consignment that then accumulates over the months. If a retailer fails to clear the last consignment, he has to purchase the next consignment of rice at a price higher than the market price. In other words, the bargaining power of retailer diminishes because of his indebtedness to wholesaler. Retailers have to clear the whole balance by the year's end (*Halkhata*). Many retailers took loans from relatives, friends or money lenders to clear the balance due by the year's end.

Table 4.13: Repayment Periodicity of the Instalments by Retailers (%)

Arrangement	Once in 2 Weeks	Once in a Week	Twice in a Week	Every other Day	Everyday
No. of Retailers	30	18	30	10	12

Source: Retailers' Survey, 1997

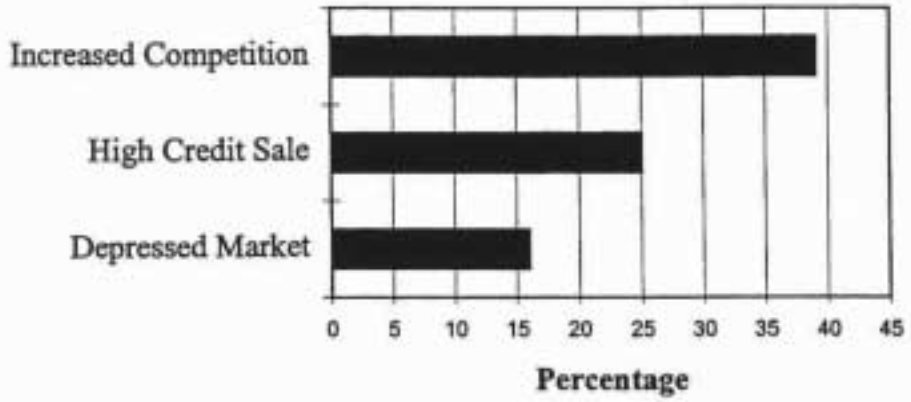
There was also no systematic pattern between "the amount of downpayment" and "the periodicity of repayment." The correlation coefficient (r) between these two variables is -0.29. However, the periodicity of repayment may affect the transaction price. For example, it was found that retailers get some price discount from wholesalers if they purchase rice for cash. The average price concession that they get is Taka 21.50 per 100 kg. of rice, which increases the profit margin of the retailers substantially. For credit purchases they do not get this discount because wholesaler has to bear disguised interest rate on money implicitly loaned to retailers.

Eighty six percent retailers surveyed in Dhaka and Chittagong were found to sell rice on credit. They employ two basic arrangements regarding the normal practices of credit sale. They provide one months of credit to consumers who are in salaried employment. For other consumers, the normal practice is to offer credit from 2 weeks to 1 month.

The Problems and Constraints of Retailers

The problems and constraints of rice retailers are reported in Figure 4.5. Thirty nine percent of retailers said that increased competition from the newly established grocery shops in and around every residential blocks in Chittagong and Dhaka cities were reducing their sales. Customers do not want to come to the market place only for purchasing rice; rather consumers prefer to purchase other groceries along with rice from one shop. So, many rice retailers are also starting to stock other grocery items such as oils, spices, etc. The next biggest problem they face is the increased credit sale to customers. This poses two problems for their business - first by increasing the

Figure 4.5: Problems of Retailers (%)



requirement of working capital and secondly by the higher incidence of bad debt. Some 25 percent of retailers reported this as a serious problem. Depressed market conditions were reported by 16 percent of retailers as the third biggest problem.

V. RICE MARKETING CHANNELS IN THE TERMINAL MARKETS

The transformation of paddy into rice and the flow of the product from farmers down to final consumers probably can best be captured by a marketing channel diagram. The predominant channels of rice marketing in Chittagong and Dhaka (and probably for other terminal areas) are depicted in Figure 4.6 below. (The predominant channels for paddy and rice marketing in the procurement areas were presented in Figure 3.1.)

Millers in Dhaka procure paddy mainly from *aratdars* in the Northern part of Bangladesh such as Sherpur, Haluaghat, Jamalpur, and Nakla. They often send their own employees to the paddy *arats* for procuring paddy. Millers in Chittagong purchase paddy from long distance *beparis* who procure paddy from Haluaghat, Sherpur, Phulpur, Nakla, and Comilla. Millers procure paddy from all the agents upstream in the marketing chain (quite often from different markets), but paddy *aratdars* are their principal sources of paddy, particularly in the pre-harvest lean seasons. They process the paddy into rice, and possibly to different qualities. (So, one can expect more diversified product

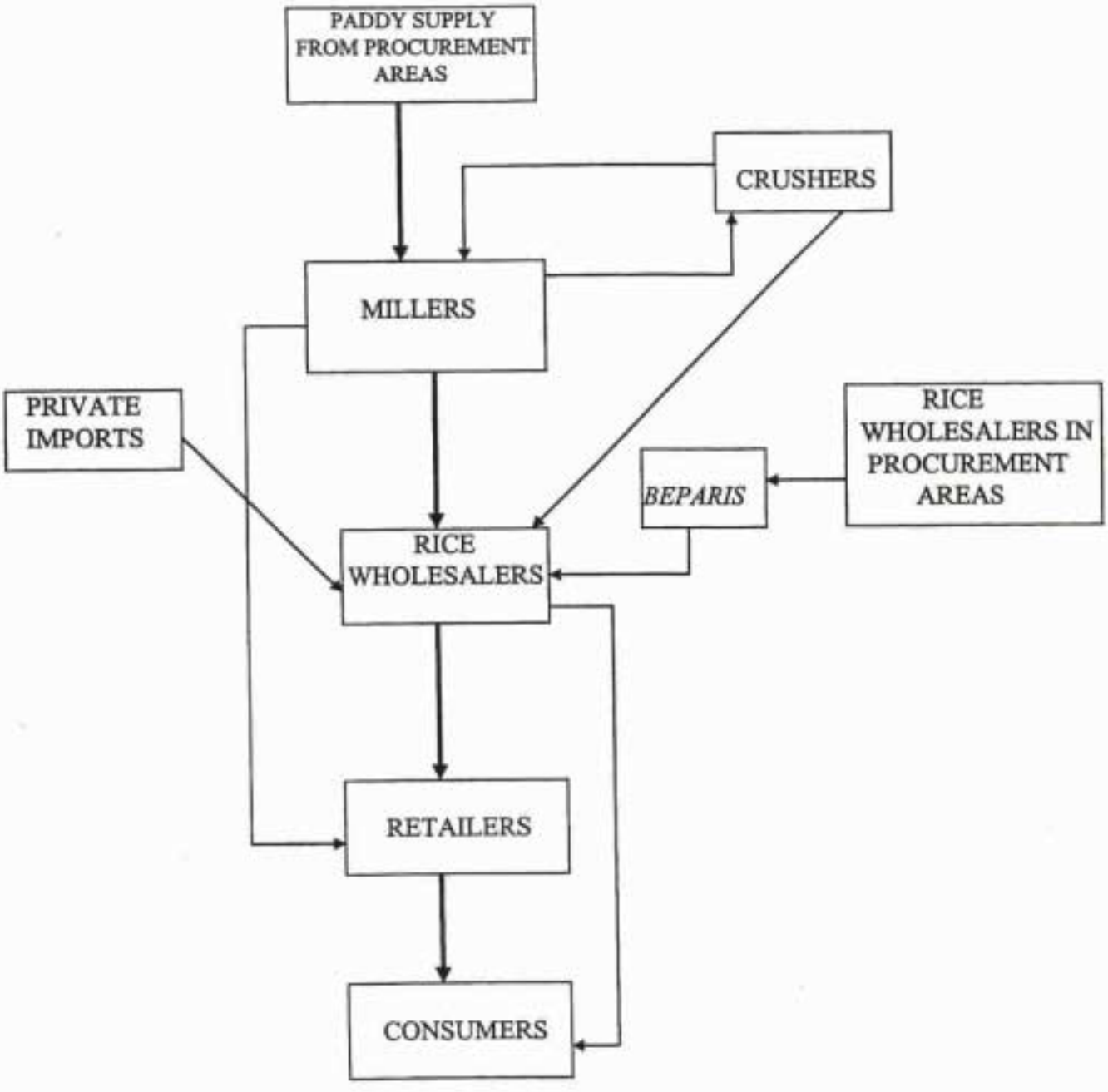
range downward from millers. Same paddy can be transformed into two or three different qualities of rice. Localised taste patterns and localised technical knowledge often dictate to millers which qualities to produce.) Millers sell rice mainly to wholesalers within the same market area and less frequently to wholesalers in other districts. Some millers in Dhaka also sell rice directly to retailers even though this is not a regular feature. The crushers also procure paddy from paddy *arats* and then have it processed in others' mills. Then they sell the rice to the local or long distance rice wholesalers.

Rice wholesalers in Chittagong and Dhaka procure rice from mills located within the same market as well as from wholesalers in the procurement areas of North and North-west Bangladesh. But the major part of their rice supply comes from the procurement areas of the country. Wholesalers in Chittagong and particularly in Dhaka sell rice to local retailers as well as to wholesalers in other rice terminal markets throughout the country.

Retailers in Chittagong and Dhaka procure rice typically from wholesalers within the same market area and then sell directly to local consumers. Some retailers in Chittagong and Dhaka (12 percent of the sample) were also found to purchase rice directly from local millers.

The above discussion points to the fact that the agents at different tiers of the paddy-rice marketing chain in the terminal markets are still very much vertically interlinked. The most important channel among different alternative rice marketing channels observed in the terminal markets of Bangladesh is described in the Figure 4.6 by bold arrows - paddy *aratdars* in the procurement areas - millers - rice wholesalers - retailers - consumers.

Figure 4.6: Alternative Private Sector Rice Marketing Channels in the Terminal markets in Bangladesh.



VI. RELATIONSHIP BETWEEN WHOLESALE AND RETAIL RICE PRICES

This section examines the relationship between wholesale and retail rice prices in Dhaka and Chittagong. Thus, attempts were made to compile rice price series for the retail markets in these two regions. Data from two different sources were compiled: monthly retail prices of the BBS, and weekly DAM data. While the BBS price series was more complete, many observations are missing from the DAM weekly price series. Moreover, the two price series are not always comparable. Since wholesale price series of DAM were available from Phase I of the project, we chose to analyse retail prices from the same source. The price data were available for the period beginning week 27 of 1987-88. Even though more recent retail prices are available, data up to 1996:22 have been included because of the availability of wholesale prices. Of the two retail price series, about 26 percent observations on Chittagong retail prices are missing, while only 18 percent are missing in case of Dhaka. The missing observations have been interpolated through linear interpolation.

Some summary information on the wholesale-retail margin (price difference) in the two terminal regions is presented in Table 4.14. The price series are also plotted in Figure 4.7. It is interesting to note that the average wholesale-retail margin has not changed significantly in Dhaka between the pre- and post-liberalisation period, but it has declined in Chittagong. However, the volatility of it (expressed in terms of standard deviations) has reduced in both markets in the recent years. With increases in price levels (in the wholesale market), the margin is generally found to decline, which is more pronounced in case of Chittagong. Moreover, the wholesale-retail margins are significantly lower, in both markets, during the later part of the *Aman* sale period (weeks 31 to 43) than they are in any other sub-period. This may arise because prices are normally high during this season.[6] With these preliminary observations, the rest of this section tests the presence of Granger causality between the wholesale and retail prices.

[6] In Dhaka, the margins are found to be lower during *Aman* sale period (weeks 23 to 43). Since consumers in Dhaka demand better quality of rice within the coarse variety and these are *Aman* produce, their availability at the retail level may need to be ensured at higher margins. It is not unlikely that the retailers hold stocks of varieties that are in great demand.

Table 4.14: Summary Information on Price Difference between Retail and Wholesale Markets in Dhaka and Chittagong

Item/Groups	Mean difference (Tk./quintal)		Standard Deviation	
Period-specific information	Dhaka	Chittagong	Dhaka	Chittagong
1987:27 to 1991:52	122.55	81.62	76.53	61.70
1992:01 to 1996:22	126.64	66.40	51.16	49.40
1987:27 to 1996:22	124.57	74.11	65.22	56.42
By quartiles of wholesale prices (Tk./quintal)*				
Up to 915.00	157.73	97.36	68.80	44.00
915.01 – 1085.00	127.67	88.51	54.22	56.25
1085.01 – 1215.50	91.82	65.14	70.46	60.60
1215.51 and above	122.51	44.79	35.81	48.35
By seasons, expressed in week numbers				
01-22 (late *Boro* sale)	133.39	82.35	49.65	53.02
23-30 (post-harvest *Aman*)	102.17	90.91	50.87	54.21
31-43 (late *Aman* sale)	87.29	53.14	60.72	52.82
44-53 (post-harvest *Boro*)	174.42	70.24	75.92	62.54

Note: * Quartile groups reported in the Table are applicable for Dhaka. In the case of Chittagong, the upper bounds of the first three quartiles are respectively, Tk. 969.50, 1084.00 and 1179.00.
Source: Own estimates based on data compiled from DAM.

As in Chapter 3, the purpose of this section is to verify whether retail rice prices are influenced by the wholesale prices. Initially, the individual price series were tested for stationarity using the Augmented Dickey-Fuller test. The hypothesis of non-stationarity (in levels) could only be rejected at the 5 percent level in the case of the Dhaka wholesale price series. The Dhaka retail and the two Chittagong price series were found to be non-stationary in levels. However, non-stationarity in first differences could be rejected at the 1 percent level in the cases of all the price series.[7] The Engle Granger test for cointegration between the wholesale and retail price series in both Dhaka and Chittagong term showed that they are cointegrated at the 1 percent level.[8] The test for Granger causality was carried out using the following ADL specification that includes lagged price differences but without the lagged levels of variables.[9]

$$\Delta y_t = \alpha + \beta_1 \Delta y_{t-1} + \beta_2 \Delta y_{t-2} + \gamma_0 \Delta x_t + \gamma_1 \Delta x_{t-1} + \gamma_2 \Delta x_{t-2} + u_t$$

[7] The t-statistics for ρ coefficient for the wholesale and retail price levels in Dhaka were respectively, -3.637and –2.7546; and they were –2.773 and –2.081 for Chittagong. The corresponding figures for first difference were –11.4479 and –13.3572 for Dhaka; and –13.259 and –12.187 for Chittagong.

[8] The t-statistics for ρ in the specification with the error term was –6.7372 for Dhaka and –6.592 for Chittagong, which are both greater than the absolute critical value of χ^2 (3.51) at 1 percent level of significance.

[9] where, Δ stands for "change in" and the subscripts identify time periods. The results are summarised in Table 4.17.

Figure 4.7: Rice Prices in Wholesale and Retail Markets, Dhaka

Table 4.15: Results from Granger Causality Tests on Wholesale and Retail Rice Prices in Dhaka and Chittagong

Null hypothesis	Dhaka		Chittagong	
	F-values	Sig. level	F-values	Sig. level
Whole sample period: 1987:27 to 1996:22				
Retail prices exogenous to wholesale prices	17.96	0.0000	9.7822	0.0000
Wholesale prices exogenous to retail prices	12.32	0.0000	11.87	0.0000
Pre-liberalisation period: 1987:27 to 1991:52				
Retail prices exogenous to wholesale prices	3.94	0.0019	1.42	0.2190
Wholesale prices exogenous to retail prices	1.97	0.0838	2.89	0.0148
Post-liberalisation period: 1992:01 to 1996:22				
Retail prices exogenous to wholesale prices	14.92	0.0000	14.92	0.0000
Wholesale prices exogenous to retail prices	13.96	0.0000	13.96	0.0000

Source: Own estimates from DAM price data.

The findings clearly suggest that the wholesale and retail rice prices in both Dhaka and Chittagong Granger cause each other when the whole sample period is considered. This bi-directional causality also holds for the post-liberalisation years. Such bi-directional causality does not, however, hold for the pre-liberalisation period. Dhaka wholesale prices are found not to be Granger caused by the retail prices at the 5 percent level even though the retail prices are Granger caused by the former. It is just the reverse in the case of Chittagong prices, where wholesale prices are Granger caused by retail prices but not vice versa. However, the estimated F-values are much higher for the post than the pre-liberalisation period, indicating that retail and wholesale prices are inter-related more strongly in the post-liberalisation period.

A final exercise conducted on wholesale-retail prices in the terminal markets was testing for asymmetric price response. The idea of these tests is to discover whether retailers pass on increases in wholesale prices to consumers as quickly, or to the same extent, as wholesale price decreases. Long-term persistence of price asymmetry is normally regarded as evidence of oligopsonistic or collusive pricing behaviour, while short-term asymmetry may relate to traders' stock adjustment procedures.

Since retail and wholesale prices in Dhaka and Chittagong were found to be non-stationary in levels and cointegrated, the format employed for testing for pricing asymmetry was the error correction framework proposed by Reilly and Witt (1996). This involves estimation of the following basic error correction model:

$$\Delta R_t = \beta_0 + \beta_1 \Delta W_t + \beta_2 \Delta W_t^* D_t + \beta_3 R_{t-1} + \beta_4 W_{t-1} + \varepsilon_t$$

where R_t and W_t denotes retail and wholesale prices, and D_t=1 if $\Delta W_t \geq 0$ and D_t=0 otherwise. If the β_2 coefficient is found to be different from zero, then there is evidence of asymmetric pricing information. Lagged price terms can be added to this basic model, allowing both the speed as well as the extent of price response to be assessed.

Table 4.16: Asymmetric Price Tests for Dhaka

Dependent Variable: ΔR_t

Number of observations: 464 weeks (1987.23 to 1997.16)

Variable	Coefficient	T-statistic
Constant	35.583	2.811**
ΔW_t	0.344	8.904**
ΔW_{t-1}	0.064	0.961
$\Delta W_{t-1}*D_t$	0.298	2.790**
ΔR_{t-1}	-0.272	-5.859**
R_{t-2}	-0.182	-7.142**
W_{t-2}	0.166	6.742**

R^2=0.23

** denotes coefficient is significant at the 1% level.

Table 4.16 shows the results of this test for asymmetric pricing applied to Dhaka wholesale and retail prices. A single period lag was added to the basic specification, as this was found to fit best using the Akaike information criterion. However, the $W_t.D_t$ term is dropped from this specification because it was not found to be statistically significant at even the 10 percent level. The coefficient on the $W_{t-1}.D_{t-1}$ term equals 0.297 is statistically different from zero at the 1 percent level. Hence, the coefficients in Table 4.16 shows that over a two week period a 10 percent fall in the Dhaka wholesale price would be expected to lead to a 4 percent (i.e., 0.344+ 0.064) decline in the retail rice price, while a 10 percent rise in the Dhaka wholesale price would be expected to lead to a 7 percent (i.e., 0.344+ 0.064+0.298) increase in retail prices. Evidence of persistent asymmetric price response was not, however, found. The long-run multiplier between wholesale and retail prices (which is given by the inverse of the ratio of the error correction terms) is 1.1. So over a number of weeks, wholesale price changes may be expected to be fully transmitted to the retail level together with a modest mark-up.

Most of this finding seems to be driven by pricing behaviour in the pre-1992 period, as when the tests are repeated for 1987-1991 and 1993 to 1996 separately, the coefficient on the $W_{t-1}.D_{t-1}$ term drops substantially, and becomes insignificant at the 5 percent level.

No evidence was, however, found for pricing asymmetries using wholesale and retail prices in Chittagong. This might be explained by the closer proximity of wholesale and retail markets in

Chittagong. However, it should also be noted that the Chittagong retail price series that were available contained a large number of missing observations, so the power of the econometric tests was very much weaker than in the case of Dhaka.

Interestingly, the results of the Dhaka exercise accord with the statements of the sampled retailers, who reported that they take an average of two-and-half days to adjust their retail prices upward when wholesale prices rise but four days to adjust their prices downward when wholesale prices decline. The sample retailers explained this practice by saying that dropping their sales prices immediately when wholesale prices declined would involve them making losses in selling off rice stocks previously purchased at higher prices. Furthermore, since most rice consumers did not have up-to-date knowledge of changes in wholesale prices, it was possible to delay dropping one's prices for a few days until other retailers also started to lower prices.

VII. SUMMARY AND CONCLUSIONS

This chapter has reported the principal findings of our Phase II survey of traders in terminal markets in Bangladesh. The survey of rice mills, wholesalers, and retailers in the terminal markets reveal distinct pictures of different rice marketing networks operating in the terminal markets, which are distinct from the networks in the procurement areas of the country. The most important findings concerning the changing structure of the rice trade are summarised in this concluding section.

Millers in the terminal markets were often found to try to create market niches, by specialising in processing one or two particular varieties of rice which are in demand in local markets. For example, millers in Dhamrai in Dhaka district were found to produce a special variety of rice, called *Naizershail*, which no other millers produce. Similarly, millers in Chittagong process only non-parboiled rice which is the most popular type of rice in Chittagong division. One distinguishing feature of mills in both terminal markets is that they are mostly rented and operate at less than full capacity (because of unavailability of paddy in the lean seasons). To ensure a steady supply of paddy for their mills, millers close to the terminal markets are diversifying into the paddy trading businesses. Almost all the millers in Chittagong have also diversified into rice wholesaling.

Millers in the terminal markets earn on average 38 Taka per 100 kg of paddy in *aman* season and 28 Taka per 100 kg of paddy in *boro* season. The profit margin for non-parboiled mills was found to be significantly higher than that for par-boiled mills.

Millers in the terminal markets face serious problems in procuring paddy from long distance markets because of high transport costs. In the lean seasons, when the price of paddy is high, the processing margin becomes so low that many mills in the terminal markets stop operating. High credit sale and the depressed rice market in general were cited by millers as their next two most significant problems.

The once dominant roles of the traditional wholesale markets in Badamtali (Dhaka) and Chaktai and Pahartali (Chittagong) have declined over the last few years. This decline is due to the emergence of new wholesale markets in other parts of the city, which are more accessible by road transportation. However, one important distinction between the newly emerging wholesale markets in Chittagong and Dhaka deserves stressing here - the newly emerging wholesale markets in Chittagong complement the traditional wholesale markets of Pahartali and Chaktai, whereas the newly emerging wholesale markets in Dhaka are competing with the Badamtali market. Another reason for the decline of the Badamatali market is the growing direct marketing network in the country in which rice is shipped directly from the mills and wholesalers in procurement areas to the consumption points.

The Phase II retailers' survey reveals that retailers in the terminal markets earn an average margin 48 Taka per 100 kg for *aman* rice and 50 Taka per 100 kg for *boro* rice. After accounting for inflation, this is more or less in line with the previous findings by other major studies on rice markets in Bangladesh. Even though we found evidence of direct marketing between many agents in the rice marketing chain, few retailers (12 percent) were found to bypass rice wholesalers and purchase rice directly from the mills. The main reason cited by retailers for not procuring from millers more frequently was lack of credit relations with millers.

Another important finding from the retailers' survey is the asymmetry in price adjustment time taken by retailers in the face of rising and falling prices in the wholesale markets. Retailers were found to take more time to adjust their prices downward when prices are falling in the wholesale markets than to adjust their prices upward in the face of rising wholesale prices. This particular phenomenon may also exist at other levels of the rice marketing chain in Bangladesh.

Retailers in the major retail markets in Chittagong and Dhaka state that they face more intense competition from grocery stores (who sell rice along with other items) than in the past. Hence, rice retailers in some areas (for example, Kachukhet in Dhaka) are starting to sell other items in addition to rice. The increased level of credit sales and depressed activities in the rice markets, in general, were cited as two other major problems by the rice retailers.

From the pricing analysis of the retail and wholesale rice prices in Dhaka and Chittagong it was found that wholesale and retail rice prices in both the places Granger cause each other, for the whole sample period (1987 week 27 to 1996 week 22). This bi-directional causality also holds for the post-liberalisation period (1992 week 1 to 1996 week 22) but does not hold for the pre-liberalisation period (1987 week 27 to 1991 week 52). Evidence was also found that the retail and wholesale prices are inter-related more strongly in the post-liberalisation period.

CHAPTER 5: PUTTING THE PADDY-RICE MARKETING CHAIN TOGETHER

The last two chapters of this report have described the structure, conduct and performance of paddy and rice markets in the major procurement areas and terminal markets in Bangladesh. As noted in Chapter 2, these may- -at least to some extent- -be thought of as representing actors on the supply and demand sides of the private sector grain trade. This chapter seeks to pull together these two sides of the trade and present a more unified picture the national paddy-rice marketing chain. In the process, some of the key issues raised in Chapter 2 concerning shortening of marketing chains, trade credit and storage are addressed more systematically.

Accordingly, Section I of this chapter discusses whether or not there is evidence that there has been a shortening of the paddy-rice marketing chain in Bangladesh in recent years. The changes in trade linkages between different agents within the chain are reviewed, and the emergence of a new group of traders ("crushers") is discussed. This leads us on to a discussion in Sections II and III of the pattern of trading firms' expansion and the role of credit advances in the chain. Section IV discusses seasonality, stockholding and market participation, while Section V deals with the problems and constraints faced by private sector traders.

I. SHORTENING OF MARKETING CHAINS IN THE PADDY-RICE TRADE

Traditionally, as noted in Chapter 2, the paddy-rice marketing chain in Bangladesh has been viewed as involving trade flows between vertically linked marketing agents, with most spatial transactions occurring at the wholesale level. According to this view, paddy is sold at the farm gate to small-scale intermediaries (such as *farias* and *beparis*) who in turn sell to paddy *aratdars*, who then deliver paddy to mills located in the procurement regions for processing. Millers then sell the rice they process on to wholesalers cum commission agents located in district headquarters or transportation hubs, who sell (possibly via a second group of independent rice beparis) to rice wholesalers located in the terminal markets, who in turn

distribute to retailers in these areas. This pattern of linkages between procurement regions and terminal markets was shown in Figure 2.1.

The survey of long distance rice traders conducted during Phase I of the project called this vertically oriented view of the paddy-rice marketing chain into question. Evidence was found of a reduction in the market power of traditional wholesaling centres, and the forging of new direct marketing links between the procurement regions and terminal markets. Drawing on these findings, Chapter 2 of this report suggested an analytical framework for investigating these emerging spatial-cum-vertical linkages, while the variety of marketing channels that are currently prevalent in the procurement regions and terminal markets have been highlighted in Chapters 3 and 4. This section draws upon these findings and summarises our conclusions concerning changes in the paddy-rice marketing chain. The key question addressed is whether there has been shortening of marketing chains.

Our Phase I and II investigations, indicated that some of the major changes that are underway in the paddy-rice marketing chain in Bangladesh include:

- Farmers are increasingly bypassing *farias* and paddy *beparis* and selling their paddy directly to *aratdars*. There has also been an increase in the direct marketing of paddy to millers, especially by large farmers in the North-west region, which bypasses *aratdars* altogether.

- Paddy *aratdars* in the procurement regions also seem to be shipping more and more paddy direct to mills located near the terminal markets, thereby bypassing both mills and wholesalers in the procurement regions. This is especially important for mills in Chittagong, where consumer preferences for non-par boiled rice (*atap*) dictates a different milling process from elsewhere in the country.

- Millers in the procurement region are bypassing rice wholesalers in the procurement regions and selling directly to rice wholesalers in the terminal markets. This new linkage is associated with the development of new rice wholesaling markets on the outskirts of Dhaka (e.g., Badda, Jatabari, and Kattuchett) and, to a lesser extent Chittagong (e.g.,

Aturar Dope, Kamal Bazar and Kamafully). In some cases, such as in Sherpur, millers' supply may be linked with credit advances made by terminal market rice wholesalers.

- Some millers in the terminal markets have also started bypassing rice wholesalers altogether, and selling directly to large retailers. Although this form of sale was not noted by the sampled mills in the procurement regions for some time, in Dhaka and Chittagong, 12 percent of retailers were found to procure directly from mills, mostly located on the urban periphery.

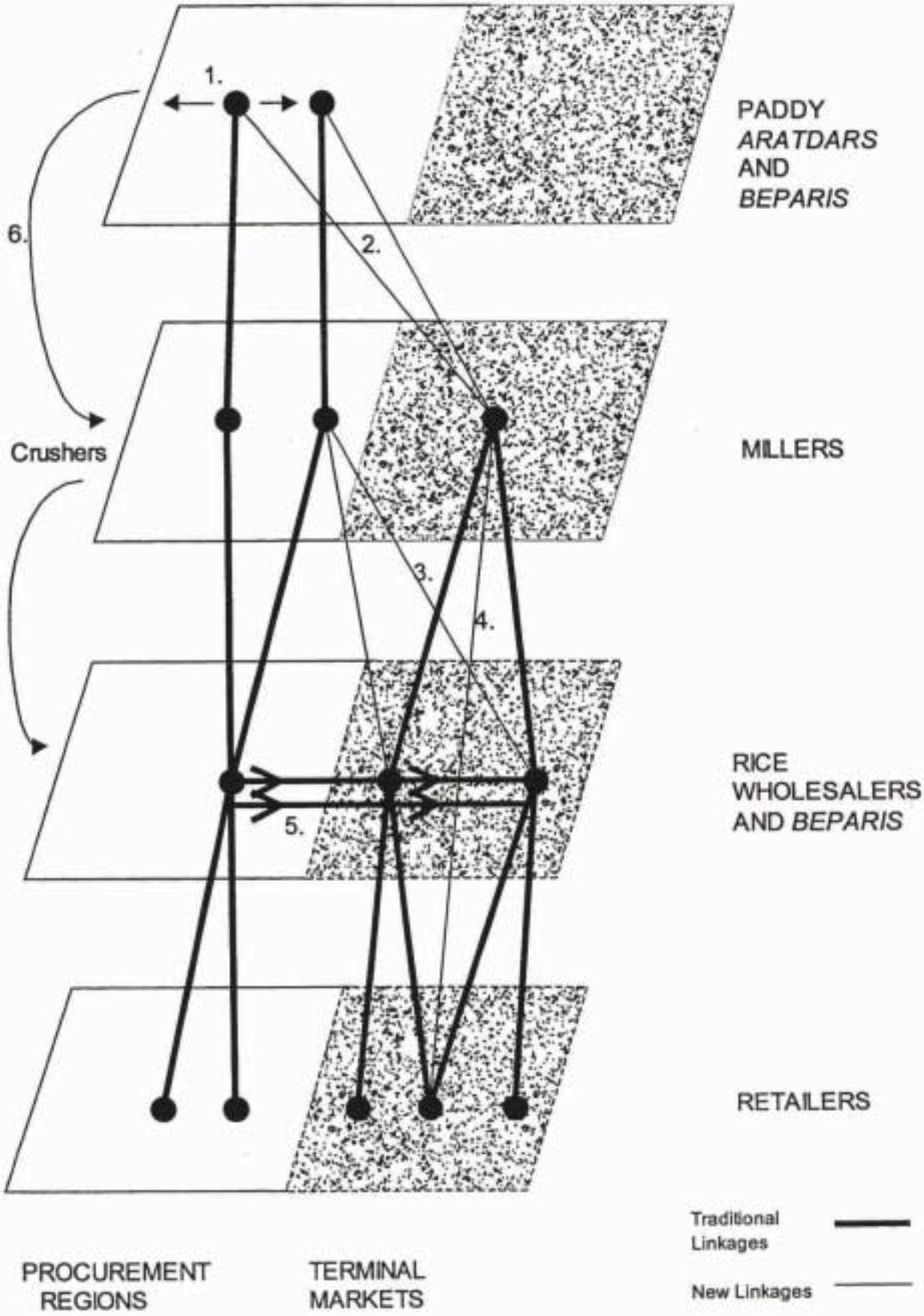
- The role of independent rice *beparis* in facilitating trade flows between wholesalers in the procurement regions and the deficit markets appear to be declining. The arbitraging roles traditionally played by independent rice *beparis* are now often performed by permanent employees of wholesalers and, to a lesser extent, millers.

- A new group of traders, whom we have described as "crushers", also seems to be growing in importance.[1] Crushers buy paddy from large farmers and *beparis/farias*, pay a fee for it to be custom milled, and then sell the rice produced on to wholesalers and large retailers. In this way, crushers bypass at least two of the agents in the traditional paddy-rice marketing chain (i.e., paddy aratdars, rice wholesalers, and, possibly, *beparis* too) and integrate a number of previously vertically linked activities under one business. At present most crushers appear to operate in relatively small geographic areas, but there is some evidence of crushers also being involved in the long-distance rice trade. There is also evidence, to be reviewed in Section IV, of crushers being involved in intra-seasonal paddy storage.

Figure 5.1 aims to summarise how these changes have resulted in new linkages developing between the four tiers of the paddy rice marketing chain that have been considered in this study.

[1] Earlier studies of the paddy-rice marketing chain in Bangladesh, such as Islam et al. (1987) and Chowdhury (1992) give very little attention to the activities of crushers. Possibly this is because the activities of crushers were subsumed under those of paddy *beparis* in these studies. It is our contention, however, that the relative importance of crushers has increased substantially in recent years.

Figure 5.1: A FRAMEWORK FOR ANALYSING RICE MARKET INTEGRATION



Taken together the above changes indicate that a number of important changes have occurred in the structure of the paddy-rice marketing chain in recent years. Most of these changes point toward a shortening of marketing chains, as farmers, millers and wholesalers in the procurement regions increasingly bypass traditional marketing intermediaries and sell directly to wholesalers and, to a lesser extent, mills and retailers. Possible explanations for this shortening of the marketing chain include the improvement in Bangladesh's road and communications infrastructure, the preferences of high-income consumers in the terminal markets, and the liberalisation of the rice trade in 1992. In particular, it may be suggested that the desire to bypass traditional intermediaries in the paddy-rice marketing chain has been driven by the need for traders to squeeze marketing margins in order to compete in an increasingly competitive private sector trade. The greater competition and lower margins induced by this new marketing dynamic have created problems for traders, but would appear to benefit rice consumers and, to a lesser extent, paddy producers.

II. VERTICAL, HORIZONTAL AND DIAGONAL EXPANSION

By investigating the histories of trading firms involved in the paddy-rice marketing chain, the Phase II study also sought to investigate how private sector traders develop, expand and diversify their trading activities. Three types of expansion of traders' business activities were distinguished: vertical, horizontal, and diagonal. Vertical expansion occurs when a trading firm combines activities on different tiers of the marketing chain, as for example happens when a rice wholesaler establishes or takes-over a mill. This is often related to shortening of the marketing chains. Horizontal expansion occurs when a trader replicates his firm's business activities elsewhere, such as when an existing miller sets up another mill. As such horizontal expansion involves activities on the same tier of the marketing chain. Diagonal expansion (which might equally be described as "diagonal diversification") involves a trader becoming involved in other related agricultural activities, such as input supply, transportation or the trading of other commodities.

Evidence was found of a good deal of vertical expansion in the paddy-rice marketing chain, with expansion up the chain being more common than down it. More than a third of paddy

aratdars (37 percent) were found to have started out as *farias* and *beparis*, while a quarter (25 percent) of rice mill owners started out as paddy *aratdars*, *beparis* or crushers. Some 9 percent of rice mills had then gone on to establish rice wholesaling businesses, although this form of expansion is much more common in the terminal markets than in the procurement areas. Some evidence of vertical expansion was also found down the chain with 12 percent of rice wholesalers establishing mills, and 31 percent of millers in the terminal markets becoming directly involved in paddy procurement.

Horizontal expansion was generally more limited with only 6 percent of paddy *arats* and 12 percent of rice mills having been established by other *arats*/mills. Some 28 percent of rice retailers in the terminal markets were found to have had previous experience in the rice business, though not necessarily as retailers themselves.

Rather more evidence was found of diagonal expansion by firms, especially in the procurement areas. Almost two-fifths (39 percent) of paddy *arats* in the procurement areas diagonally expanded their rice trading businesses into other agricultural related activities. The most popular of these were jute and wheat trading (28 percent), agricultural inputs (8 percent) and transportation (3 percent). Similarly, 27 percent of rice mills in the procurement areas expanded diagonally into agricultural input supply (17 percent), agricultural equipment (5 percent) and transportation (5 percent). In the terminal markets, millers were found to engage in much less diagonal expansion with just 6 percent diversifying into the agricultural input business. This presumably reflects the lower demand for agricultural inputs in the urban areas, since there is no reason to suppose that millers in the terminal markets are less capitalised than in the procurement areas.

The firm histories collected also showed a relatively young age-structure of the mills. Just over 80 percent of the *arats* and mills survey had been established during after 1980s, with over half of the new mills being established in the late 1980s and early 1990s. It is also interesting to note that very few establishments had been inherited. Some 91 percent of the *arats* and 85 percent of the mills surveyed had been established by their current owners. The growth in the number of rice mills over the last 15 years comes not from the horizontal expansion of existing mills but from new, independent entrants.

What can be learned about the structure of the paddy-rice marketing chain in Bangladesh from these findings? First, the relatively high level of new entrants indicates that barriers to entry are relatively low in the lower tiers of the paddy-rice marketing chain. This is perhaps not surprising for paddy aratdars, where the capital requirement for starting up a business is relatively modest, but is more revealing for rice mills. Second, the relatively low level of horizontal expansion indicates that there is little evidence of traders to try to grow in order to dominate particular tiers of the marketing chain. Instead, when trading firms expand they seem to do so either vertically or diagonally. This might reflect relatively low profit margins in the paddy and milling business, but may also reflect individual traders' desire to spread risk across a number of different activities. When taken together with the growth in the number of *aratdars* and millers over time, such upward expansion seems to provide evidence of a fairly competitive marketing system. Third, the impetus to expand firms' activities vertically provides some evidence of the shortening of marketing chains. In particular, millers in the terminal market areas were found to be becoming involved in both paddy procurement and rice wholesaling, while *aratdars* in the procurement areas were taking over the activities of smaller *beparis* and *farias* and selling directly to millers. If the desire to shorten marketing chains is motivated by the need to squeeze marketing margins, this may again be adduced as evidence of a growing level of competitiveness in the marketing system.

III. CREDIT ADVANCES IN THE PADDY-RICE MARKETING CHAIN

Both the Phase I study and Chapters 3 and 4 indicate that changes have occurred in the relative configuration of power within the paddy-rice marketing chain in Bangladesh, both across geographical locations and between vertical tiers within the chain. One important source of market power is the control over finance that goes into procuring paddy and rice. Clearly, such credit advances play an important role in facilitating trade between the different tiers of the marketing chain. It is, however, possible that such credit transactions may restrict competition in what appear otherwise to be atomistic and competitive markets. This section investigates the importance of credit advances in the Bangladesh paddy-rice marketing chain, along with relative importance of traders engaged in different tiers in the market.

Information on sources of credit advances that are contingent on the procurement of paddy or rice is a sensitive one. With the kind of semi-structured questionnaires used during our Phase II survey, it was therefore not believed to be advisable to attempt to obtain quantitative information on the amount of such advances. Instead, each tier of traders interviewed was asked to identify the types of traders from whom they made purchases and to whom they sold. This was followed up by a question asking the trader to identify the type(s) of financial arrangement(s) that was (were) employed for such transactions. Since respondents may have engaged in more than one arrangement with the same contracting party, there were often multiple responses to this question. Thus, it has not been feasible to arrive at definitive figure on the share of advances in the total value of paddy/rice traded. Nonetheless it has been possible to establish the prevalence of credit advances in the paddy-rice marketing chain and their sources.

Figure 5.2 attempts to capture the extent of trade credit flows along the paddy-rice marketing chain in Bangladesh, by summarising the flows of trade credit advances between different tiers of marketing agents. These are all expressed as percentages of particular tiers of traders.[2] The top half of Figure 5.2 identified the percentage of millers in the sample who received or made credit advances, while the bottom half identifies the percentages of *aratdars* who received or made advances. Those who received advances did so from agents higher up the marketing chain, and the figure shows the percentages of millers and *aratdars* receiving credit advances from each source. Similarly, the percentage of millers or *aratdars* making advances to agents down the marketing chain are recorded for each recipient. While the two halves of Figure 5.1 cannot be related using the same scale of measurement, the linkages representing millers' advances to *aratdars* (in the top half) correspond to those for *aratdars* receiving advances from the millers (in the bottom half).

Only 25 percent of millers received advances from rice wholesalers, with the rice wholesalers in "distant" markets being generally more important as a source of credit than local rice wholesalers. Some 7.5 percent of millers also received advances from rice *beparis* engaged in the long-distance trade. These averages do, however, hide significant variations in the

practice of credit advances between regions. For example 62.5 percent of millers in Sherpur received advances from distant rice wholesalers compared to 20 percent of millers in Dinajpur and 8.3 percent in Naogaon. Almost half (47.5 percent) of the millers advanced credit down the chain, with almost one-third (32.5 percent) of millers advancing credit without receiving any advances themselves[3]. It is noteworthy that more than one-third of the mills that advance credit, do so directly to farmers (Table A.5.2).

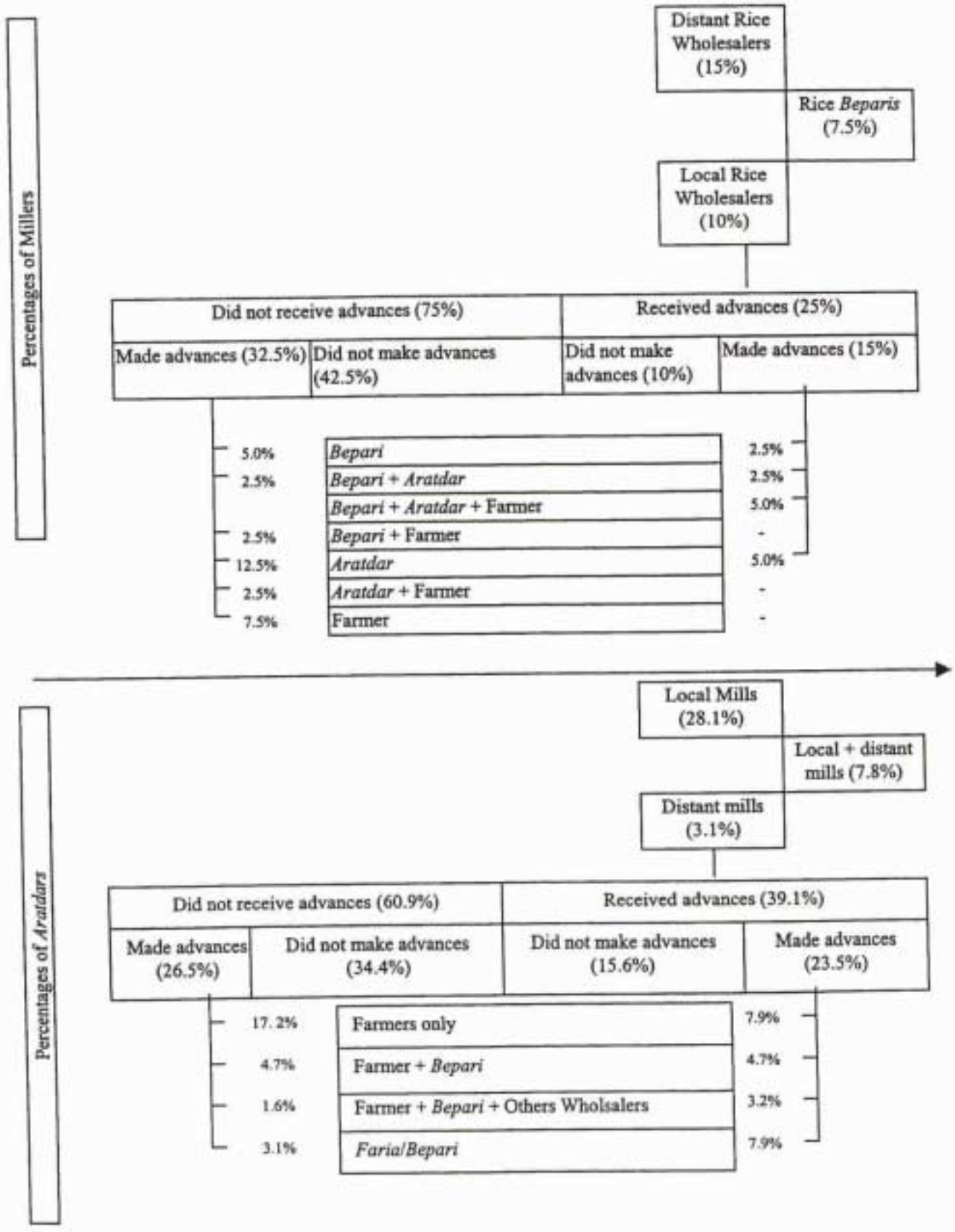
Three fifths (60.9 percent) of paddy *aratdars* did not receive cash advances, while almost two-fifths (39.1 percent) received advances from millers. Of the *aratdars* who did not receive any advance, less than a half (26.5 percent) made advances down the marketing chain. Most of this latter group made advances to farmers (23.4 percent out of 26.5 percent) together with other paddy traders. A high incidence of credit advances to farmers (15.8 percent out of 23.5 percent) may also be observed for those *aratdars* who did not receive advances from millers.

There are two other interesting aspects to note about credit advances in the paddy-rice marketing chain. First, there is an increasing trend amongst *aratdars* and millers to bypass traditional intermediaries, such as *farias* and paddy *beparis,* and make credit advances directly to farmers. Clearly this relates to the issue of the shortening of the paddy-rice marketing chains discussed in the previous section, since those who receive advances are expected to supply paddy to those who have advanced them credit. Second, there are significant variations in the practice of credit advances across regions, especially between

[2] Details on credit advances received and made by the sampled millers are summarised in Table A.5.1 in the appendix to this chapter. The same information is provided for paddy *aratdars* in Table A.5.2.

[3] It is quite possible that some other sources of credit to the millers may have been missed out. One likely candidate is credit from independent *bepari*. Since none of the respondents mentioned obtaining credit from any other source, their volume must be insignificant.

Figure 5.2: Credit Advances in the Paddy-Rice Marketing Chain



Sherpur and the other two procurement regions studied in Phase II. These findings would seem to reflect differences in the growth patterns of wholesale rice marketing in the three regions. Given its proximity from Dhaka, millers in Sherpur (which has no central wholesale market of its own) have become an important source of supply for rice traders operating in the small wholesale markets on the peripheries of major urban centres. In contrast, Naogaon, with its unified and dominant wholesale market and substantial interlocking of millers with paddy *aratdars* through credit advances, appears to be an independent actor in the national marketing chain. Dinajpur occupies an intermediate position, which is reflected in the number of rice wholesale markets that exist in the district, as well as the extent of direct linkages that many of its millers have with rice wholesalers located in the terminal markets.

Assessing the impact that credit advances have on the competitiveness and efficiency of the paddy-rice marketing chain is a difficult task. On the one hand, credit advances may be seen to facilitate trade flows both within and between different tiers and locations within the marketing chain. Indeed, trade credit may serve to help forge the new linkages between different tiers of the marketing chain discussed in Section I. On the other hand, credit advances may act to restrict competition by limiting the number of trading partners with whom an individual trader can engage in transactions with. Credit advances also seem to be an important part of the story of the shortening of marketing chains and, in particular, the forging of direct linkages between mills in the procurement regions and rice wholesalers in the terminal markets.

IV. SEASONALITY, STOCKHOLDING AND MARKET PARTICIPATION

Estimating private foodgrain stocks has always been a difficult task in Bangladesh, and since "stocks" are of relevance primarily in the context of temporal arbitrage, they have not been a key focus of our Phase II study. Furthermore, since three-quarters of paddy stocks are held on-farm (Chowdhury, 1992) our Phase II survey of *aratdars* and millers could not hope to capture the main agents of paddy storage.[4] Nonetheless, in order to understand how their

[4] Most stocks are normally kept in the form of paddy, because of the deterioration of rice after milling.

stockholding behaviour influences the paddy-rice marketing chain and price formation, it is worth investigating the seasonal pattern of market participation.

The Phase II survey of aratdars and millers was designed to capture seasonal variations in market participation by different marketing agents. The agricultural year was split up into four seasons, and aratdars and millers were asked to state the percentage of paddy they procured from different agents in each of the four seasons.[3] By analysing procurement patterns in the two slack (non-harvest seasons), this section hopes to glean some indications concerning the involvement of paddy aratdars and millers in stockholding, together with the implications of such seasonality for the paddy-rice marketing chain.

Information on market participation of by different categories of traders during the slack seasons is summarised in Table 5.1 and Table 5.2. Table 5.1 shows those agents supplying paddy to *aratdars*, while those supplying paddy to millers are included in Table 5.2. Three aspects of this presentation of stock holding require clarification. First, we realised early on in the Phase II survey work that the respondents were often reluctant to identifying crushers separately from custom millers (because many of the millers themselves were involved as partners in such crushing venture). We therefore decided to ask millers to report on a combined figure, hoping that its size and seasonality would reveal the characteristics of the source. Second, as noted in Chapter 3, some paddy *aratdars* were found to procure from other smaller *aratdars* in the same market as well as from farmers and *beparis*. This latter group is identified as "other paddy wholesalers" in Tables 5.1 and 5.2. Finally, in Table 5.2, government milling has been identified as a separate category in order to highlight the extent to which the rice mills in different regions depend on government contracts.

[3] The Phase II questionnaire was designed to capture information pertaining to four different seasons, post-*Aman* harvest (mid November to mid February), pre-*Boro* or late *Aman* (mid February to mid May), post-*Boro* harvest (mid May to mid August) and pre-*Aman* or late *Boro* (mid August to mid November). The second and the fourth of these may be considered as "slack" seasons.

Table 5.1: Market Participation during the Slack Seasons, based on *Aratdars'* Paddy Procurement
(percentages of volume of paddy procured during the season)

ITEMS	REGIONS		
	Sherpur	Dinajpur	Naogaon
Share of traders in total procurement during pre-*Boro* season			
Farmers	47.70	64.36	79.97
Farias/Beparis	51.93	24.60	13.67
Other paddy wholesalers	0.37	11.04	6.36
Share of traders in total procurement during pre-*Aman* season			
Farmers	43.28	75.00	80.85
Farias/Beparis	50.64	17.14	11.94
Other paddy wholesalers	6.08	7.86	7.21

Source: Phase II survey in the procurement regions.

Table 5.1 suggests that farmers are the most important suppliers of paddy to aratdars during the slack seasons, especially in the North-west region. Even though farmers are generally believed to sell most of their paddy in the immediate post-harvest season, the fact that their sales to aratdars during the slacks seasons accounts for the majority of aratdars' procurement indicates a significant degree of stockholding by farmers.[6] Farias and beparis are also shown to play an important role in supplying paddy to aratdars especially in Sherpur. Since these intermediaries are usually small and undercapitalised petty traders, it seems likely that they work as pure spatial intermediaries and do not undertake storage of paddy. The difference in the roles played by farmers and *farias/ beparis* in Sherpur and the markets in the North-west may reflect poorer state of physical infrastructure in Sherpur region. Finally, as it is know that the volume of paddy sales is lowest during the slack season, the findings in Table 5.1 also suggest that the traders lumped together in the "other wholesalers" category (and who account for between 6 to 11 percent of total slack season sales in the North-west region) may also be involved in stockholding. Since this group sells the paddy it procures and stores to *aratdars*, it is unlikely that they are linked with agents higher up in the marketing chain.

[6] Chowdhury (1992) noted this change in the paddy market, based on household survey data.

Table 5.2: Market Participation during Slack Seasons, based on Millers' Paddy Procurement
(percentage of volume of paddy procured during the season)

ITEMS	REGIONS		
	Sherpur	Dinajpur	Naogaon
Share of traders in total procurement during pre-*Boro* season			
Farmers	8.93	46.42	18.66
Farias/Beparis	16.95	8.33	9.23
Aratdars	55.67	26.30	47.28
Custom milling/Crushers	18.44	6.93	16.92
Government milling	0	12.02	7.91
Share of traders in total procurement during pre-*Aman* season			
Farmers	9.58	37.37	12.37
Farias/Beparis	6.76	10.19	2.77
Aratdars	70.42	31.71	49.78
Custom milling/Crushers	13.24	5.89	26.77
Government milling	0	14.84	8.31

Source: Phase II survey in the procurement regions.

Table 5.2 shows that the agents who supply paddy to millers are not the same as those who supply paddy to the *aratdars*. *Aratdars*, as one would expect, are the most important suppliers of paddy to millers in both Naogaon and Sherpur, where they account for around half of the paddy procured by millers. In Dinajpur, however, farmers play a more important role in supplying paddy to mills with a corresponding decrease in the supply from aratdars. Procurement from *aratdars* is highest in Sherpur during the pre-*Aman* season, where government milling is also negligible. The contribution of *beparis* to millers total paddy procurement is relatively insignificant.

The most interesting finding in Table 5.2 is the significant presence of "custom millers/crushers". This group of paddy traders accounts for almost one-sixth of the paddy milled during the slack seasons in Naogaon and Sherpur. The fact that almost three-fourth of such milling in Sherpur and 100 percent in Naogaon are done in the slack seasons clearly indicate that this group is engaged in paddy storage rather than custom milling for household requirements. Our informal enquiries also suggest that crushers often use the trading premises or rent storage space in mills for intra-seasonal paddy storage.

To conclude, the following observations may be made regarding which agents play critical roles in maintaining stocks and thereby ensuring (or, causing) seasonal price stability (or, instability). First, farmers are shown to supply a significant amount of paddy to mills and *arats* in the slack seasons. This seems to confirm Chowdhury's conclusion that the traditional view of farmers being forced by financial circumstances to sell their paddy at harvest time is now *passe*. Furthermore, procurement from farmers in the slack seasons is most important in Dinajpur. This may partly be explained by improved road communication, the dispersion of milling clusters, and the presence of larger farms there. Second, *farias* and *beparis* do not appear play a much less active role in paddy procurement in the off seasons. Where *farias/beparis* do play a role in stockholding, such as in Sherpur, it seems likely to be under the financial sponsorship of either millers or *aratdars*. Third, while *aratdars* are important actors, they are not a homogenous group. While *aratdars'* traditional role has been viewed as commission agents, some of them are also engaged in holding paddy stocks, either using their own funds or advances received from millers. Finally, the study provides new evidence on the presence of a new group of traders, identified here as "crushers". This group of traders procures paddy, arranges for it to be milled when the time is right, and then sells the rice to wholesalers in local or distant markets. Crushers are more important in Naogaon and Sherpur than in Dinanjpur, and may be in a position to influence rice prices in these markets. Future research is needed to examine this group of traders more closely.

V. PROBLEMS AND CONSTRAINTS OF PRIVATE SECTOR TRADERS

All the interviews conducted with traders during both the Phase I and the Phase II surveys concluded with a free form question asking the respondent to identify the three most important problems their businesses had experienced during the last three years. Traders' responses to these question were noted down long-hand, and then followed-up with a question concerning whether traders had any suggestions for how the problems they had mentioned might be dealt with. The long-hand responses were then grouped and summarised at the data analysis stage. When combined with the more qualitative information provided by the Chairmen and Secretaries of trade associations, DAM officials, and other key informants, the information collected in this way provides a unique perspective concerning the problems and constraints faced by traders in the paddy-rice marketing chain.

Figure 5.3: Major Problems and Constraints of Rice Traders

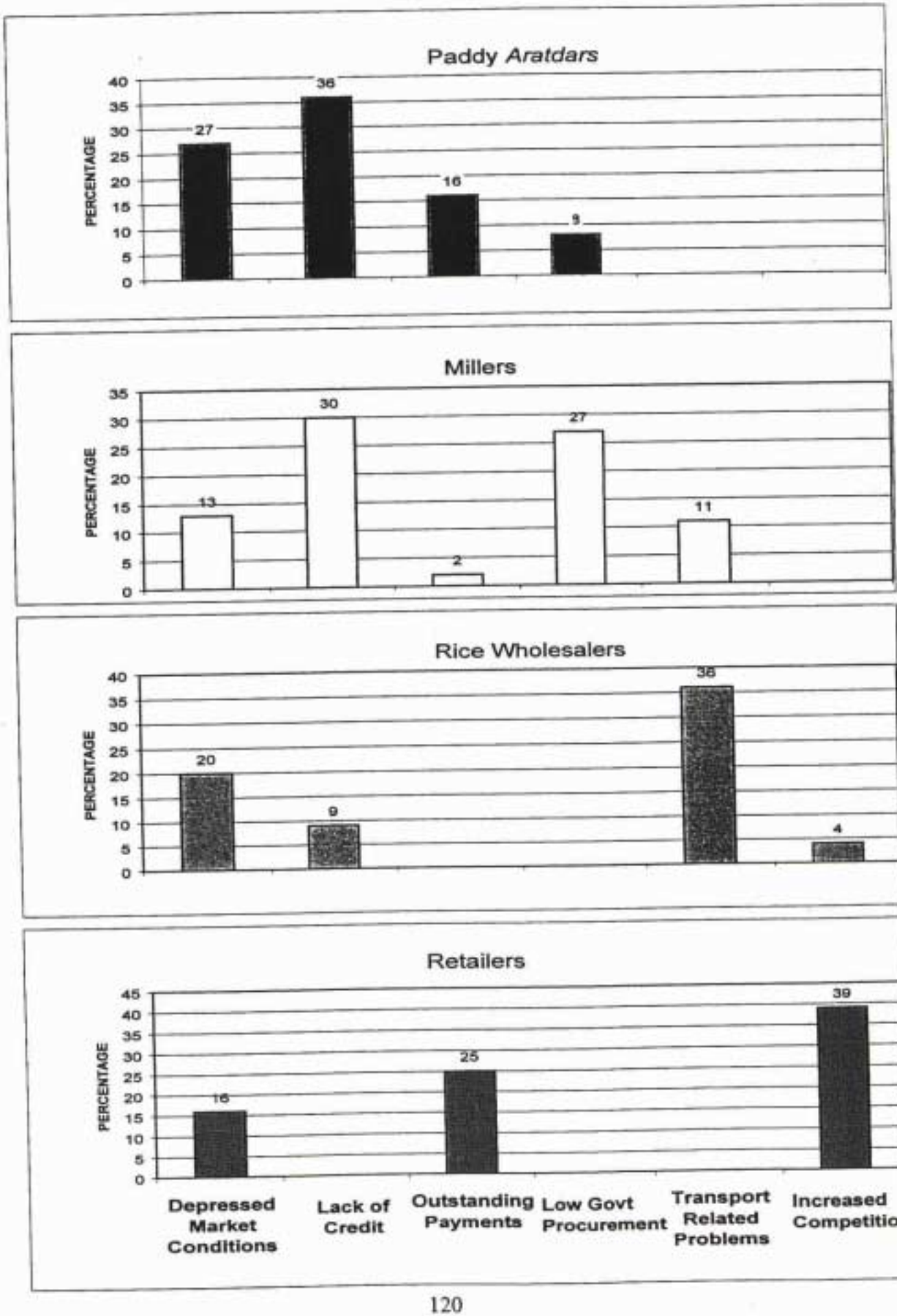


Figure 5.3 synthesises the results of traders' responses according to the four tiers of the marketing chain identified in our analytical framework. While a concern about depressed market conditions in recent years is common to all four groups of traders, their other problems are more specific. Traders operating toward the lower end of the paddy-rice marketing chain are most concerned with lack of institutional credit facilities and reduced levels of government procurement in recent years. Some 36 percent of paddy *aratdars* and 30 percent of millers stated that lack of credit was one of their three main problems. This concern is closely linked to Chapter 3's findings that most paddy *aratdars* and millers interviewed depend on their own funds for establishing and operating their business, the limited number of rural bank branches, and the inability of *aratdars* to provide collateral against loans. As one moves up the marketing chain, transport related problems become of greater concern, particularly to rice wholesalers. Overall, 36 percent of rice wholesalers and 11 percent of millers listed transportation among their three principal problems. Interestingly, it was rice wholesalers in the terminal markets who expressed more concern about transport related problems than those loaded in the procurement areas. The increasing levels of traffic congestion around the traditional rice wholesaling markets, such as Batomtoli Babu bazaar, truckers' strikes and the need to make side payments to ferry crossing (*ghat*) operators are notable here. Millers located near to the terminal markets were also found to be much more concerned about transport related problems than their counterparts in the procurement areas. Here it is problems of procuring paddy from distant areas rather than traffic congestion that is the major worry. Millers in the procurement areas were, in contrast, much more concerned about lack of credit and electricity load shedding than millers on the urban peripheries. Rice retailers were most concerned about problems due increased competition in recent years. Many of the retailers interviewed in Chittagong and Dhaka indicated that it was becoming increasingly difficult to operate a profitable shop as a pure rice retailer, and were consequently starting to diversify their retailing activities. Another way in which retailers have responded to increased competition was by allowing more of their regular customers to purchase rice on credit. This, in turn, has however lead to their second major problem of outstanding payment from customers, which was listed as a key problem by 25 percent of the retailers interviewed.

The rice wholesalers interviewed in Phase I also complained much more of "socio-political problems", such as demonstrations and strikes (*hartals)*, and excess importation of rice than the other traders interviewed during Phase II. Despite the fact that traders were asked about the major problems they had experienced over the last three years, there is a natural tendency for interviewees to pay most attention to recent events in their responses. Since the Phase I survey of wholesalers was conducted in the first quarter of 1997, but the Phase II survey was conducted during the last quarter of that year, wholesalers responses may therefore have been more affected by the wave of *hartals* accompanying the elections and change of government in 1996. Their memories of the period of high rice prices and imports of coarse rice from Eastern India in late 1995 and early 1996 will have also been more recent. The greater emphasis given to socio-political problems by rice wholesalers may also reflect the fact that *hartals* affect traders located in urban areas more than those in rural ones.

When asked for their suggestions about how to tackle the problems they had listed, most traders' responses were rather predictable. Paddy aratdars and millers who had complained about low government procurement and lack of credit stated that the Ministry of Food should procure more paddy, that interest rates should be reduced, and that more bank branches be established in rural areas. Similarly, rice wholesalers and millers experiencing transportation related difficulties suggested that more public expenditure was needed on roads and bridge construction. Among the wholesalers interviewed in Phase I, it was also considerable concern was also expressed about the need to make illegal side payments to police, officials and *chandabaz*. Given the significance of various side payment in some traders transfer costs, some traders were also very keen to argue that payments of *chadbanzi* and other side payments must be controlled more strictly.[7]

It is worth, however, probing into the connections behind the different problems listed by traders in some more detail. At the level of the individual market participant, there is clearly a connection between the depressed market conditions noted by all four groups of traders and the low levels of government procurement noted by paddy *aratdars* and millers and increased competition noted by wholesalers and retailers. To the extent that these problems

[7] The Phase I survey also found that illegal fees and sidepayments were highest when rail or river rather than road transportation was employed by long-distance wholesalers. In the extreme cases of rail transportation from Naogaon, such payments constituted 18 percent of total handling costs, while in Chandpur they made up 23 percent of handling costs on the river.

experienced by traders reflect the impact of market liberalisation, and translate—via better spatial market integration and lower marketing margins- -into lower prices for consumers and higher prices for producers, they need not be of great concern to policy makers. However, while there is evidence from the Phase I pricing analysis of the increasing spatial integration of markets since 1992, there is no corresponding indication that marketing margins are decreasing from the pairwise comparisons of marketing margins made in Chapters 3 and 4 of this report.

Millers and paddy *aratdars* (and by implications paddy *beparis* and *farias* too) are clearly more hindered by lack of access to institutional credit than rice wholesalers and retailers. This is ironic as both categories of traders are net sources of credit advances to those lower down the marketing chain. In the absence of data on the volume of credit advances between different categories of traders, we would here hypothesise that it is millers who are more credit constrained than paddy *aratdars*. Clearly, it takes a considerably larger capital sum to set-up a milling than a paddy wholesaling business, and working capital requirements (including those for making cash advances down the chain) are probably higher than for paddy *aratdars* too.

Indeed, this multiple credit squeeze may be why a lower proportion of paddy aratdars were found to expand vertically into milling, than did paddy *bepari* and farias into crushing. Given the considerable amount of capital need to establish and operate a rice miller business, and the difficulties in obtaining institutional credit to do this, many more paddy *arats* seem to prefer to expand diagonally into other agricultural related businesses (such as input supply, or wheat and jute trading).

At the same time, because millers can offer institutional lenders collateral, by securing their loans on either their premises or machinery, it is feasible for existing financial institutions to expand their lending in this area. Indeed, given the tripling in the sampled mills' storage capacity over the last fifteen years, it may well be worth investigating the feasibility of expanding the inventory credit to them. Interesting a similar scheme (BASWAP/SHO GORP) focusing on enabling farmers to store paddy is currently operating in nine locations throughout Bangladesh. If a similar, albeit much larger (and presumably also commercial

more attractive) scheme could be established for millers in addition to relieving their immediate credit constraints, it seems likely that such action would have knock-on effect elsewhere in the marketing chain (by allowing millers to make larger credit advances to *aratdars* and large farmers from who they procure paddy).

VI. SUMMARY AND CONCLUSIONS

This chapter has attempted to pull together the demand and supply sides of the paddy rice marketing chain in Bangladesh, and synthesise some of the key issue concerning patterns of firm expansion, trade credit, seasonality and market participation, and the key problems and constraints faced by private sector grain traders.

Overall there is evidence that a number of important changes have occurred in the structure of the paddy-rice marketing chain in recent years. Farmers are delivering more and more paddy directly to millers, while *aratdars* in the procurement areas are also taking over the activities of *farias* and paddy *beparis* and selling directly to millers. In addition, millers and wholesalers in the procurement regions are increasingly bypassing traditional marketing intermediaries (such as rice *beparis*) and selling directly to wholesalers in the terminal markets. Mills in the terminal markets, in particular those serving high quality niche markets, are also procuring paddy direct from the procurement regions and then selling direct to large retailers. Taken together with the development of new rice wholesaling centres on the outskirts of Dhaka and Chittagong, these changes point towards a shortening of the national paddy-rice marketing chain in recent years.

Such shortening of marketing chains seems to have been accompanied by changes in the pattern of trade credit advanced between different tiers of the marketing chain, and increasing vertical expansion of paddy and rice traders. In the procurement areas, *aratdars* and millers were found to be making cash advances directly to farmers, particularly large farmers in the North-west. Similarly, many millers were found to accept deposits of paddy from farmers, which allowed farmers the flexibility to choose the best time at which to sell their paddy while providing millers with interest free advances in kind. In Naogaon and Sherpur, there

was also evidence of the growing importance of a new group of traders we have described as "crushers", who procure paddy from farmers, store it in rented premises, arrange for custom milling when the time is right, and then sell the rice on to wholesalers in local and distant markets. Millers in the terminal markets, in particular Chittagong, were also found to be increasingly involved in both paddy procurement and rice wholesaling.

The relatively high level of new entrants into most tiers of the marketing-chain indicate that barriers to entry are relatively low, while the low level of horizontal expansion indicates that there is little evidence of individual traders trying to replicate their activities in order to dominant particular tiers of the marketing chain. Indeed, in the procurement areas more paddy *aratdars* seem to expand diagonally (into other agricultural trading activities) than expand vertically and become millers. This reflects both the general level of excess milling capacity in the county, and the inability of most *aratdars* to access institutional credit. Retailers in the terminal markets also seem to lack access to credit, which is one of the reason they cited for continuing to buy from rice wholesalers even when rice could be sourced directly from nearby milling clusters at lower prices.

Traders stated problems and constraints varied according to the tier of the paddy-marketing chain in which they operated. Traders operating toward the lower end of the chain, such as paddy *aratdars* and millers, were most concerned with lack of institutional credit facilities and reduced levels of government procurement in recent years. But as one moves up the marketing chain, transport related problems become of greater concern, particularly to rice wholesalers and to millers in the terminal markets. Rice retailers were most concerned about the increasing level of competition in recent years, which has been forcing them to make more credit sales to final consumers, as well as diversifying into retailing of other goods.

Overall, the picture that emerges is one of a dynamic and well-functioning marketing chain. Along with a thickening in the number of market participants at each tier of the marketing chain, new marketing channels and forms of more flexible contracts between traders are developing. In the establishment of milling clusters and rice wholesaling centres on the urban peripheries, the increase in millers' cash advances to farmers, and the emergence of

"crushers", the private sector trade's desire to forge new, more direct marketing links is most in evidence. Such shortening of marketing chains will, as noted in the Phase I report, have feed into the improvement in the spatial integration of wholesale markets in recent years. In some cases, however, the ability of firms to develop such linkages or expand vertically has been constrained by lack of credit or poor transportation facilities. But the trade has shown itself to be innovative in responding to such constraints. Rather than attempting to suppress or compete with this new marketing dynamic the Bangladesh government should aim to find ways of reinforcing and strengthening the inherent strengths of private sector marketing dynamic. Some preliminary suggestions in this regard are included in Chapter 7.

Table A.5.1: Percentages of Millers Receiving and Making Credit Advances

Advances made to	No advances received	Advances received from					Row total
		Local rice wholesalers	Distant rice wholesalers	Local + distant Wholesaler	Rice *bepari*	*Bepari* + distant wholesaler	
No advances given	42.5	5.0	2.5	-	2.5	-	52.5
Farmers only	7.5	-	-	-	-	-	7.5
Paddy *aratdar* only	12.5	-	2.5	2.5	-	-	17.5
Paddy *bepari* only	5.0	2.5	-	-	-	-	7.5
Farmer + *bepari*	2.5	-	-	-	-	-	2.5
Farmer + *Aratdar*	2.5	-	-	-	-	-	2.5
Aratdar + *Bepari*	2.5	-	-	-	-	2.5	5.0
Farmer+*aratdar+bepari*	-	-	2.5	-	-	2.5	5.0
Column total	75.0	7.5	7.5	2.5	2.5	5.0	100.0

Source: Estimates based on Phase II survey in the procurement regions

Table A.5.2: Percentage of Paddy *Aratdars* Receiving and Making Credit Advances

Advances made to	No advances received	Advances received from			Row total
		Local mills	Distant mills	Local and distant mills	
No advances made	34.4	10.9	1.6	3.1	50.0
Farmers only	17.2	4.7	1.6	1.6	25.0
Faria/bepari only	3.1	6.3	-	1.6	10.9
Farmer + *bepari*	4.7	4.7	-	-	9.4
Farmer + *bepari* + other wholesalers	1.6	1.6	-	1.6	4.7
Column total	60.9	28.1	3.1	7.8	100.0

Source: Own estimates based on Phase II survey in the procurement area.

CHAPTER 6: WHEAT MARKETS IN BANGLADESH

I. INTRODUCTION

Wheat, once a residual food item, has gradually become part of the regular diet of most urban dwellers in Bangladesh, as well as of some segments of rural population. Even though the total quantity of wheat available for consumption every year remained stable over the last decade[1], there have been important changes in the composition of its sources, the varietal mix, and the markets that are served. Domestic wheat production grew at a rate of about 5 percent, from below 900 thousand metric tons in 1988 to above 1454 thousand metric tons in 1997 (unpublished BBS source). During this period, a transition of the wheat industry has been initiated, from a Public Food Distribution System (PFDS) driven simple processing to a miller/baker driven diversified end-product targeted industry. The liberalisation of the foodgrain market since 1993, especially through allowing the private sector to import wheat, had immensely contributed towards facilitating this transition process. It is quite expected that there have been subsequent changes in the marketing chains and in the relative roles played by different agents. However, in the absence of a comprehensive understanding about the changing characteristics of the wheat market in Bangladesh, our study has refrained from engaging into such issues as have been dealt with in the previous chapters on rice. Instead, the focus has been on tracing the important changes in the market along with providing estimates on relative size of the various market linkages.

There are several important ways in which the wheat market in Bangladesh differs from the rice market. One major difference lies in the way the two products are consumed. Rice, after paddy is milled (husked), is marketed for direct consumption. In contrast, milled wheat can be made into a number of different intermediate products that again are processed into various end-produce for final consumption. It is true that there is product

[1] Annual consumption of wheat has remained stable during the past decade with about 2.0 to 2.5 million metric tons, of which, 1.0 to 1.5 million tons were produced domestically and 1.0 to 1.5 million tons were imported (see Table 6.1). Although PFDS off-take fluctuates considerably from year to year, the trend in wheat consumption has not increased during the past decade. However, there is a general consensus that per capita consumption of wheat and wheat product has increased considerably in urban areas as demonstrated by the increase in modern flour milling capacity, bakeries and retail outlets for fast food.

differentiation in case of rice as well. However, such differences arise primarily at the stage of paddy cultivation; and milling may only make some finer differentiation in terms of polishing, grain size, moisture content, etc. While some aspects of product differentiation in wheat are rooted in the species of wheat produced, most however arise at the stage of milling and beyond. There are two other aspects in which the two grains differ in the specific context of Bangladesh. First, rice is mostly locally produced while a large proportion of wheat (more than half in most years) consumed in the country is imported. Since bulk imports are normally involved, the sizes of the agents involved in the wheat market may differ from those in the rice market. The second aspect relates to the relative roles played by the public and the private sectors in the two markets. While the public sector has often been active in the paddy and rice market, its share in total volume of traded rice remains quite marginal. In contrast, the public sector's presence in the wheat trade is still quite significant.

Only a few studies of the wheat market have been undertaken in Bangladesh. These include the IFPRI report on the structure-conduct-performance of the wheat market (Chowdhury 1993) and the report by Kranti Associates Limited to the FPMU (Kranti, 1994). Chowdhury's study dealt comprehensively with the various tiers in the wheat market, the extent of participation by various agents including their market size, and estimates on marketing margins. His work, however, dealt with a period when the market was primarily driven by PFDS wheat flows. Kranti (1994) attempted to assess the prospects for private sector wheat imports; and does cover marketing issues with the private sector wheat import already in place. Since the regular marketing agents are already described, we refer to these two studies for the details. In order to provide insights into the dynamics of the wheat market, we touch on the issues of marketing chains only to supplement previous studies. We also draw upon the findings from previous studies in deducing inferences about the future of the wheat market.

The marketing chains of wheat are described in the following section, without yet differentiating between the various types of wheat. Data pertaining to changes in the size of the market, as well as the relative roles played by agents in different positions in the

marketing chain, are presented in this section. Section III incorporates the concept of product differences within wheat, provides further details of the marketing chains involved, and provides some preliminary estimates on the relative size of different segments within the market. The final section discusses some key policy issues.

As had been noted in the Phase I study, there is an extreme dearth of price data on wheat, and the problem is further accentuated because it is difficult to consider either wheat or wheat flour (*atta*) as homogeneous products. It has, therefore, not been possible to analyse price integration in wheat market, nor to estimate marketing margins for the different product types within the wheat sector. However, an analysis of interaction between rice and wheat prices has been included in Section III.

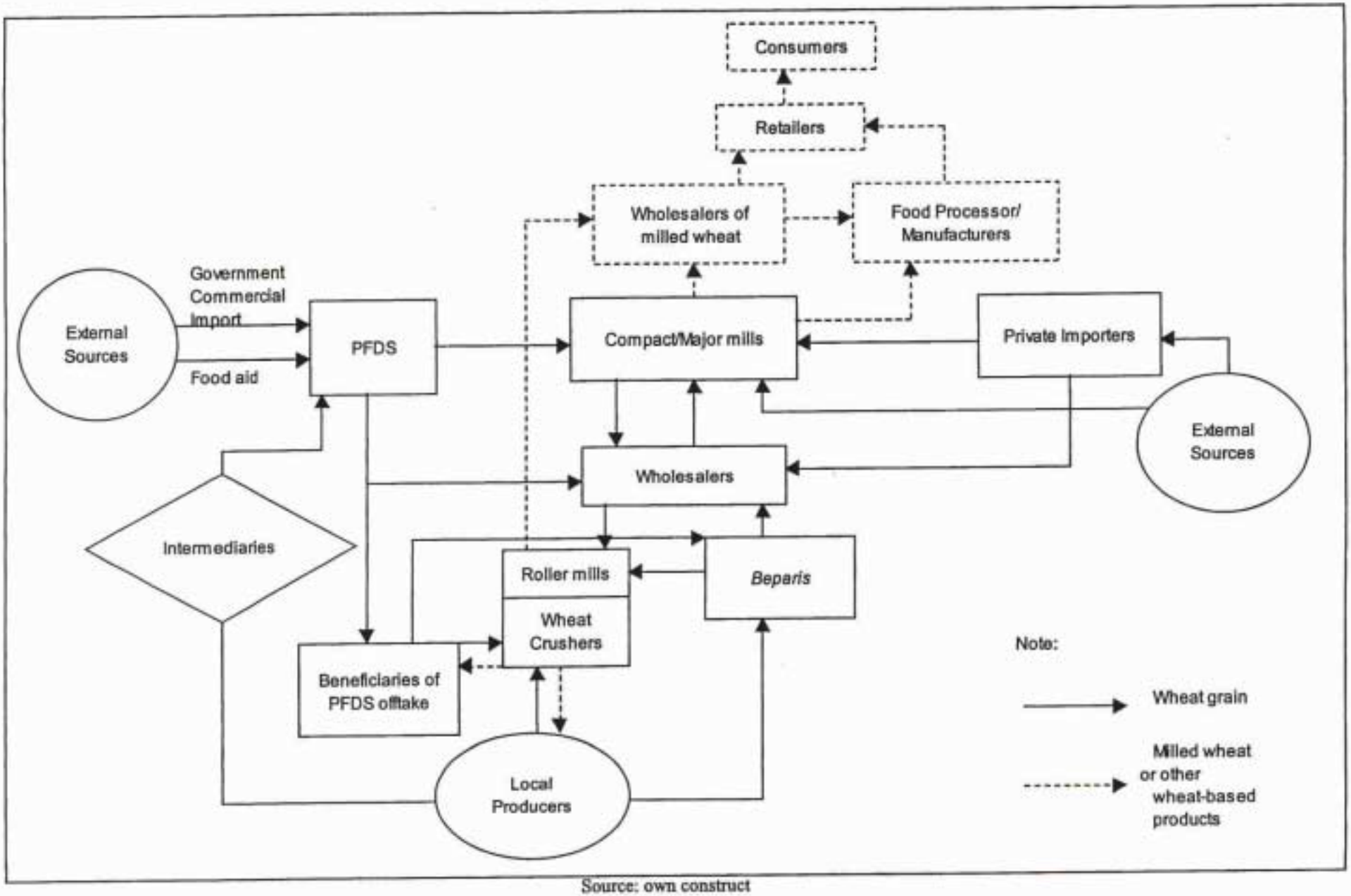
II. WHEAT MARKETING CHAINS IN BANGLADESH

This section gives a broad overview of the different wheat marketing chains that operate in Bangladesh and describes the various agents involved in such chains. Summary information is also provided on the changes in the relative importance of various wheat channels following the liberalisation of wheat imports in 1992.

Sources of Wheat Supply

Figure 6.1 highlights the major actors who are involved in the Bangladesh wheat market. Almost half the wheat consumed in Bangladesh is locally produced. The share of external procurement of wheat has declined over the years (see Table 6.1). The latter may, however, be sub-divided into three groups: food aid, commercial imports by the government, and private sector wheat imports. Up until mid 1992, the government was the sole authorised importer of wheat. Since it has been a regular practise to meet food deficit through commercial import of wheat (after accounting for food aid commitments),

Figure 6.1: Wheat Marketing Chains in Bangladesh



Source: own construct

Table 6.1: Sources of Wheat Supply in Bangladesh

Year	*Food aid*	*Government Commercial import*	*Private import*	*Domestic net production*	*Total supply ('000 mt.)*
1989-90	44.62	16.02	0	39.36	2035.0
1990-91	61.91	1.50	0	36.59	2469.6
1991-92	55.33	6.04	0	38.63	2483.4
1989-90 to 91-92	54.54	7.34	0	38.12	2329.3
1992-93	32.22	4.18	15.97	47.62	2222.4
1993-94	34.24	0	12.46	53.30	1909.9
1994-95	32.04	13.66	15.06	39.24	2855.5
1995-96	28.64	13.64	9.83	47.88	2573.1
1996-97	26.79	4.54	11.02	57.66	2269.6
1992-93 to 96-97	30.68	7.92	12.90	48.50	2366.1

Note: All figures, unless otherwise stated, are row percentages.
Source: Compiled from FPMU data.

the share of the commercial imports in total wheat import varied with changes in local production and inflows of food aid. In August 1992, private imports of wheat were permitted. The government also withdrew all restrictions on bank credit facilities for private foodgrain trade around that time. Since 1992 between 222,000 to 430,000 metric tons of wheat have been imported by the private sector each year. Initially after the withdrawal of restriction there was no import duty on importation of foodgrain. However, the government imposed a 7.5 percent import duty on wheat imports in November, 1992, which was raised to 15 percent in July, 1993. Import duty on wheat was later revised downward to 7.5 percent on 28th December, 1994. Currently there are no barriers to import of wheat, with the exception of an *ad valorem* charge of about 13 percent on its c.i.f. value.

Table 6.1 shows Bangladesh's total wheat supply, together with a breakdown of its sources, from 1989/90 to 1996/97. The most striking feature of the summary information presented in Table 6.1 is the growth in domestic production of wheat. In conformity with the IFPRI 1992 wheat farm survey (Chowdhury 1993), we assume that for 1996-97 about 44 percent of the net wheat production are consumed on farm, 8.2 percent are procured by the government agency, and the rest 47.8 percent are sold by the farmers to private traders.[2] Thus, if all PFDS wheat were assumed to enter the market, locally produced wheat would account for 39.4 to 43.2 percent of marketed wheat, while privately imported wheat would account for only around 15 percent.[3] If however, only 40 percent of all PFDS offtakes are assumed to enter the wheat market, local wheat would contribute 53.9 to 57.8 percent of marketed wheat, and the corresponding figure for private imports would be around 20 percent in 1996-97 (see discussion in Section III). These figures suggest that private sector imports and locally produced wheat may be more significant than is often perceived.

Origins of Externally Procured Wheat

Imports of wheat had been the government's monopoly over the last few decades. During the 1980's, wheat constituted about 80 percent of total government foodgrain imports[4], most of which came in as food aid. Average annual imports of wheat in five years before liberalisation (1987/88 to 1991/92) was 1.75 million metric tons. Government wheat imports declined sharply after liberalisation to an annual average of 0.9 million mt. During the five year period after the liberalisation of imports (1992/93 to 1996/97), virtually all food aid to Bangladesh has been provided as wheat, with food aid contributing more than three-quarters of average PFDS imports. During 1987/88 through 1991/92 period, annual average quantum of food aid was 1.35 million mt. The amount almost halved during the post-liberalisation period. The origin of 60 percent of food aid

[2] While the IFPRI study (Chowdhury 1993) was done prior to significant amount of wheat imports by the private sector, it is safe to assume that the use pattern of locally produced wheat did not change much after the liberalisation in 1992.

[3] The lower bound is defined for the case when government procurement of local wheat is not included, while the upper bound applies to a case when such procurements are included in farmers' contribution to the market.

[4] The GOB generally preferred to import general-purpose soft wheat though significant quantities of rice importation occurred in some bad crop years.

was North America (USA 36 percent and Canada 24 percent), with most of the remainder (33 percent) from Europe.

During the period 1987/88 to 1991/92 government commercial imports of wheat accounted for about a quarter of total imports. But after liberalisation, the five year average came down to about one-sixth of total imports. This reduction was mainly due to (informal) suspension of public wheat supply to commercial flour millers, who were now permitted to import wheat directly. The origin of 70 percent of the government's commercially imported wheat was North America and Argentina during 1987/88 to 1991/92, while in the following three years the entire quantity were bought from the U.S.A due to substantially lower prices offered under the Export Enhancement Program (EEP) bonus entitlement to Bangladesh[3]. After withdrawal of EEP entitlement by U.S.A since August, 1995, Australia and Europe captured the Bangladesh's wheat market by offering lower price than U.S.A or Canada.

During 1992/93 to 1996/97, the annual average quantity of privately imported wheat was 305,000 metric tons, which is almost comparable to the annual quantity allocated to the flour mills by PFDS until 1991/92. Initially the U.S. emerged as the prime source of private sector wheat imports due to the relatively good quality of its wheat and the price support offered under the EEP. During the first three years of the post-liberalisation period, U.S.A. was the prime source for private imports of wheat. But with the suspension of US-EEP bonus facility in August '95, Australia and India became Bangladesh's major source of private imports due to lower freight and shorter voyage time. Moreover, higher international wheat prices during early-1995 through mid-1996 encouraged private sector imports of cheap Indian wheat. Indian wheat supplies dried up in mid-1996 and world wheat price became more affordable since October, 1996. It was therefore possible for U.S.A, Australia and Argentina to make commercial wheat sales to

[3] The programme, administered by the U.S. Department of Agriculture (USDA), provided price support to U.S. exporters and thus enabled them to compete with other wheat exporting countries in the world market.

Bangladesh in subsequent period. Table 6.2 summarises the information on relative contribution of different countries and regions to Bangladesh's import of wheat, but does not include any estimate on informal imports from India.

Table 6.2: External Procurement of Wheat by Country/Region of Origin

Region/ Country	Food aid		Government commercial import		Private import	Total foreign	
	1987/88 to 1991/92	1992/93 to 1996/97	1987/88 to 1991/92	1992/93 to 1996/97	1992/93 to 1996/97	1987/88 to 1991/92	1992/93 to 1996/97
USA	35.75	35.87	59.20	83.35	53.93	41.14	47.69
Canada	24.46	21.46	5.19	0	0	20.03	12.78
EU	32.77	31.80	21.00	4.91	0	30.07	19.70
Australia	6.27	10.79	6.43	11.74	19.07	6.31	13.01
Others	0.74	0.08	8.18	0	27.00	2.45	6.61
Total ('000 mt)	1344.2	726.0	401.0	187.4	305.2	1745.2	1218.6

Note: India and Argentina are included in "others".
Source: Compiled from FPMU data.

Dispersion of Domestic Wheat Production

Physical characteristics, such as, irrigation status, land elevation and soil texture, are the principal determinants of crop choice in Bangladesh. In contrast to rice, wheat tends to be planted in high-lying, light-textured soil (Morris, Chowdhury and Meisner, 1997). This is reflected in the concentration of wheat production in a number of regions in Bangladesh, as shown in Table 6.3. Two northern districts of Khulna division and the whole of the north-west region of the country account for almost two-third of the country's total wheat production. With the possible exception of the two districts in

Khulna, there does not appear to be any significant impact of wheat market liberalisation on regional differences in wheat production. This is quite expected since the agro-climatic condition is a major determinant of wheat cultivation.

Table 6.3: Regional Shares in domestic Wheat Production

Region	Share in total production of wheat (column percentages)		Share in population
	1989/90 to 1991/92	1992/93 to 1995/96	
Bandarban	0	0	0.3
Chittagong	0	0.01	10.8
Comilla	8.28	7.71	9.7
Khagrachari	0	0	0.4
Noakhali	0.09	0.12	5.5
Rangamati	0	0.01	0.5
Sylhet	1.05	0.76	8.0
Chittagong division	9.41	8.60	
Dhaka	5.37	4.95	21.1
Faridpur	6.69	6.22	6.2
Jamalpur	3.88	4.02	3.5
Kishoreganj	1.96	2.00	2.7
Mymensingh	1.96	1.70	6.6
Tangail	3.21	3.48	3.5
Dhaka division	23.07	22.37	
Barisal	0.64	0.78	6.2
Patuakhali	0	0.01	2.3
Jessore	7.26	9.47	5.7
Khulna	0.57	0.55	6.9
Kushtia	7.43	8.56	3.3
Khulna/Barisal division	15.91	19.37	24.4
Bogra	3.85	3.29	4.1
Dinajpur	14.76	13.33	4.8
Pabna	11.01	12.11	5.0
Rajshahi	9.32	10.55	8.5
Rangpur	12.67	10.39	9.5
Rajshahi division	51.61	49.67	31.9

Source: Calculated from BBS figures.

Offtakes of Wheat from Public Food Distribution System (PFDS)

The Public Food Distribution System (PFDS) remains a key actor in the wheat market in spite of the emerging importance of the private sector trade. As noted above, the PFDS procures wheat from external sources (through food aid and commercial purchases) and from domestic sources. While subsidised rationing and payments in wheat for labour under the Food for Work (FFW) programme were once the major outlets for PFDS wheat distribution, there have been significant changes over time. Shares of PFDS offtakes through various channels are summarised in Table 6.4, where several trends are noteworthy. These are:

- Distribution of wheat through urban ration shops (at subsidised prices) has almost been phased out;
- The Rural Rationing (RR) system that came in place during the 1980s was abolished in 1991 due to high degree of leakage;
- Open market sales (OMS) have become a more frequently sought distribution mechanism during times of high market prices; and
- There has been a shift towards non-priced distribution away from the priced distribution. Within the latter, the Food for Education (FFE) programme to promote primary education for all and secondary education for girls has gained much prominence.

Table 6.4: Shares of Various Channels in PFDS Offtakes of Wheat

Offtake channels	Annual averages	
	1989-90 to 1991-92	1992-93 to 1996-97
Statutory rationing (SR)	11.37	1.19
Rural rationing (RR)	1.06	0
Essential Priority (EP)	3.64	8.92
Other Priority (OP)	11.21	0.37
Large employers (LE)	2.04	0.86
Open market sales (OMS)	0.46	5.53
Flour mills (FM)	16.35	3.88
Palli (rural) Chakki (crusher) (PC)	6.38	1.85
Auction and others	0	0.90
Total Priced Distribution	52.50	23.51
Food for work (FFW)	29.83	39.80
Special test relief (STR)	0.64	0.40
Test Relief (TR)	4.14	8.12
Gratuitous Relief (GR)	1.17	1.06
Vulnerable group development (VGD)	11.73	14.59
Food for education (FFE)	0	11.7
Others	0	0.83
Total non-priced distribution	47.5	76.49
Total wheat distribution ('000 mt)	1491.20	944.56

Source: Calculated from FPMU.

Recipients of PFDS wheat, other than flour mills, are grouped together as "Beneficiaries" in Figure 6.1. It is estimated that about 300,000 to 400,000 metric tons of such PFDS offtakes find its way into major and compact flour mills either directly or through regular market channels. This amount is equivalent to more that one-third of flour mills' demand (see Section III). The rest of the PFDS offtake (400,000 to 800,000 metric tons) are directly consumed by the beneficiaries in the form of *atta*,[8] mostly crushed by roller mills and *atta chakkis* (wheat crushers). There are, however, two major sources of leakage in the PFDS. First, the recipients themselves trade or sell a portion of their wheat to purchase other commodities. Second, wheat is "leaked" mainly at the Local Storage Depot (LSD) and Thana level, prior to distribution to the targeted recipients.

In the wheat marketing chain, the millers are crucial actors. There are two broad categories of flour mills: major/compact and roller mills. In addition, there are numerous

wheat crushers (*atta chakkis*), particularly in rural Bangladesh. Roller mills and *atta chakki* produce only *atta*. There are more than 3000 roller mills in Bangladesh, with an aggregate capacity of 0.5 million metric tons of wheat per year on a one shift basis. There are numerous rural wheat crushers producing *atta*, often on commission from wheat consumers and farmers. The number of wheat crushers is estimated at more than one thousand (Kranti, 1994). The major and compact mills produce mainly white flour and by-products such as semolina, vermicelli, etc. However, major and compact mills are also capable of producing *atta* only. According to a recent estimate, there are more than 300 major and compact flour mills with a capacity to mill about 1.1 million metric tons of wheat per year on a one-shift basis.

There are a few other private sector agents in the wheat market, such as, *Beparis* and wholesalers, who make the wheat grains available to the mills from farmers, importers and PFDS beneficiaries. We have deliberately avoided discussing them because they have been quite adequately described in Chowdhury (1993) and Kranti (1994).[7] Here we draw upon some of the findings from our Phase I study (Jaim *et al*, 1997).

Largely because of the geographic concentration of production, the Phase I survey found that the wheat traders were concentrated in few markets. In many instances, they were seasonal operators; or else, had to combine trading in other commodities along with the wheat trade. The warehouse capacities in various market locations clearly indicated that bulk storage is important in the case of imported wheat, since large privately owned warehouses are only observed in Chittagong and Narayanganj. The study had also observed that active trading in domestic wheat was only observed during the months of March to May, while trading in imported wheat is more active during the rest of the year (especially the October-January period). Since the direction of trade flows and the relative roles played by various agents change with the kind of wheat traded, it is to be

[6] *Atta* is a coarse flour that includes a high percentage of bran.

[7] According to Chowdhury (1993), there were 1.5 to 2 million wheat farmers in 1992; and there were 12.6 thousand farias who solely bought from farmers and sold mostly to wholesalers. The assembly market wholesalers in the procurement region were found to remain active during the wheat harvest season (March to June); and there were less than 120 terminal market wholesalers who remained active throughout the year. Chowdhury (1993) further noted that large millers relied upon terminal-wholesalers to assemble wheat on their behalf.

expected that market characteristics change systematically within a year. The study had provided estimates on wholesaler's margin from engaging in long-distance wholesale trade in wheat.

III. PRODUCT DIFFERENTIATION IN WHEAT AND THEIR IMPLICATIONS FOR THE WHEAT MARKET

Changes in the wheat market after import liberalisation were not reflected in Chowdhury's findings. Some aspects were however captured in Kranti (1994). For example, it was noted that urban wheat crushers (*atta chakkis*) had been adversely affected by liberalisation while their rural counterparts could still thrive upon PFDS wheat. The report also mentioned of the competition that the urban wheat crushers were facing from brand-name products. These observations hint at increased importance of product characteristics in the wheat market and possible correspondence between the differentiated product market and various segments within the wheat market. Similar observations have also been made in the IFPRI report to the European Union on the latter's food aid programme to Bangladesh. However, none of the reports develops the concept to address the dynamics of wheat market in Bangladesh. We attempt to do so in this section.

Bangladesh's traditional wheat market was established by the Government who had, until late-eighties, little or no concern for the functional quality of wheat. Thus, the quality requirements of food processors engaged in producing end products were hardly addressed. However, it is also true that the demand for wheat-based products was not sufficiently developed to call for such attention. The liberalisation of the wheat trade in 1992 has led millers and bakers to experiment with the diversity of wheat/flour they could now buy. They learned to adopt their processes to improve quality and increase value added, and subsequently, some made large investments to acquire modern milling/baking technology. This transformation in the wheat industry was made feasible due to the enhanced exposure of the customers to western tastes and diet, and increased pace of urbanisation. This section attempts to conceptualise the key aspects of the

differentiation of wheat and wheat-based products, and trace its implications for the wheat market in general.

Most functional characteristics of wheat-based end products are intrinsic to the wheat varieties that go into producing the flour which, in turn, is used to make the end products. For example, an important attribute necessary for making good quality noodles is starch viscosity, particularly in the production of instant noodles. The basic indicators of wheat quality are protein content, gluten and moisture content. Among others are, hardness (or softness), colour (white or red), uniformity in kernel size, etc.[8] These characteristics determine the kinds of milled wheat (and the amount) that can be extracted which, in turn, determine the kinds of end products that can be made. Thus, the values of the end products have a direct correspondence with the price that each variety of wheat may fetch.

Beside their potential contribution towards value added, there are several other factors that influence prices fetched by individual variety of wheat. They include, among others, such factors as;

- high test weight that gives more flour,
- bigger kernels yielding more flour,
- heavier kernel yielding more flour,
- disparity in moisture content among kernels in a lot that lowers flour extraction, and,
- disparity in hardness among kernels which lowers flour extraction.

Thus, wheat grains cannot be considered to be homogeneous product, and it makes little sense to conduct pricing analysis when the wheat market is systematically segmented. This is the subject to which we turn next.

[8] There is, however, some overlapping among classes of wheat used for different end uses, largely because of the possibility of blending.

Upon milling wheat, a number of items may be obtained. They include *atta* , white flour, semolina, bran and dust. By reducing the content of bran in regular *atta*, millers often obtain fine *atta* that fetches a higher price among urban middle class consumers. Scope for product differentiation arises primarily in the use of flour. White flour is commonly used in the production of bakery products, sweets, vermicelli, noodles and various other items served in hotels and restaurants. Bran and dust are both by-products of the milling process, while semolina is produced from the embryo of wheat seeds. The extraction rates of different types of *atta* (defined in terms of percentage of bran content) and flour depend in turn again on the characteristics of wheat grains. For example, high protein wheat gives 65 percent high quality flour and 25-30 percent bran, while low protein wheat produces medium quality *atta* or low quality flour.[9] Similarly, the hardness and colour of wheat are important in determining what products may be produced from them and therefore what price wheat will fetch.

Identifying these broad linkages between characteristics of wheat grains, types of milled wheat and types of end products, we describe the wheat varieties obtained from different sources. Most domestic wheat are of softer white varieties with low protein content (between 9 to 10 percent), low to medium gluten content, high moisture content (in the range of 14 to 16 percent), and have a high percentage of foreign matter (dust/mud). Within the locally produced varieties, *Sonalika* produces fine quality *atta* or low quality flour, while medium quality *atta* or low quality flour may be obtained from the *Akbari* variety. Pure local varieties, which are now less common, are mainly used to produce low quality *atta*. Given such options, locally produced wheat is suitable mainly for household preparation of flat breads.

The commercial wheat imports by the government are largely influenced by the price factors, and are therefore, of low quality with protein content of around 9.5 percent. The wheat imported from the U.S.A. and Argentina are soft reds, while those from EU and Australia are soft whites. In contrast, it is difficult to pre-judge the quality of wheat

[9] Wheat with medium protein content can be milled to produce 90 percent fine quality atta or 70 percent low quality flour.

entering into Bangladesh in the form of food aid. Such quality would depend on origins; and may range from low to high quality.

In recent years, private importers have moved into procuring better quality wheat. During normal years, their imports are hard wheat of high protein and low moisture content, for which they have to pay higher than average market prices of wheat. This pattern however breaks down during periods of abnormally high domestic prices, as it happened in 1994-95 and 1995-96. During those years, both the domestic prices of wheat and rice rose substantially at a time when the world market price of wheat was also high. Private traders therefore sought to import soft and low quality wheat from India, targeting the non-flour mills.[10] Significantly lower transportation costs were one reason for importing wheat from India during these two years.

In summary, the discussion above has argued that it is meaningless to talk about a single price of wheat, even when wheat grain is considered. The wheat market in Bangladesh has become increasingly demand driven, while the demand for differentiated products by different groups of urban and rural consumers has influenced the mix of flour, fine quality *atta* and general *atta* that mills provide. Demand for different qualities of wheat is perceived here as a derived demand. Most interestingly, in such a market of differentiated products, private importers in Bangladesh have preferred to capture the market for high quality wheat. In a way, this gives them greater security in their businesses and makes them less vulnerable to unanticipated government interventions in the wheat market. In the rest of the section we provide some initial estimates on the relative size of trade flows through various linkages involving millers.

We focus on wheat trade flows and processing in a year, and choose 1996-97 for expositional purpose. A selected number of traders and millers of different categories were interviewed in Dhaka, Narayanganj and Chittagong markets to arrive at the mix of various types of wheat that different miller groups used. Millers were also interviewed about the mix of products they produced, as well as on their usual rates of extraction.

[10] Roller mills and the wheat crushers are identified as non-flour mills since they do not have the technology to produce white flour.

Since no hard data is available on either the actual volume of milling in a year or the private stock of wheat grains, we consider 80 percent of domestic production in 1996 and 20 percent of the production in 1997 to have been milled in 1996-97. In the cases of food aid, government commercial imports and private imports, we include 60 percent of the inflows in 1996 and 40 percent of the 1997 inflows. These percentages are arrived at through discussion with key persons engaged in the trade and industry, and are tentative.

Based on a prior knowledge, it is assumed that about 60 percent of wheat channelled through the PFDS is consumed by recipient households, while the remainder 40 percent is marketed. These assumptions allow us to arrive at some figures relating sources of wheat supply and broad categories of end products, the details on which are presented in Table A6.1 in the Appendix. Table 6.5 below provides a summary of this information, which shows that privately imported wheat is primarily consumed by the major and compact wheat mills and is used for producing white flour.

Domestically produced wheat normally arrives in the main wholesale markets between April and July. Though *atta chakki* and roller mills are the main users of domestically produced wheat, use by major and compact mills account for just less than one-third of it. Flour millers combine domestic wheat with imported wheat according to proportions that depend on the quality of domestic wheat produced in a particular year. Compared to domestic wheat, the flourmills use a larger percentage of foreign wheat; 60 percent of the PFDS wheat and 80 percent of wheat that are privately imported. It was also found that the white flour extraction rate for privately imported wheat is higher than corresponding figures for wheat from the other two sources.

Table 6.5: Linkages between Sources of Wheat Supply, Mills and End products

(in thousand metric tons)

Items	Domestic wheat	PFDS wheat	Private import
Wheat crushers/Roller mills			
Amount of wheat used	959	500	60
Production: Raw *atta*	669	332	40
Fine *atta*	217	128	15
White flour	0	0	0
Major and compact flour mills			
Amount of wheat used	301	300	240
Production: Raw *atta*	0	0	0
Fine *atta*	115	73	41
White flour	116	149	134

Source: Own estimate based on FPMU data on aggregate variables.

Table 6.6 shows the mix of end products that are obtained from use of white flour. White flour is used by bakers and processors to make everything from bread and buns to pizzas, cereals and cakes. In 1996-97, the modern flourmills are estimated to have used about 0.85 million metric tons of wheat to produce 0.65 million metric tons of product. One-third of their total production is estimated to be fine *atta* (not more than 10 percent bran) and the remainder (bran less) white flour. Half of the produced white flour does not go through further processing, and is used by households and restaurants. About a quarter of white flour production is estimated to be used by bread, biscuit and cookies factories and the other quarter is consumed by manufacturers of (i) sweet, (ii) vermicelli, noodles, pasta, and (iii) by bakeries and pizzerias, with almost equal shares. Out of total white flour use, two-thirds is by the urban and industrial areas of the country.

Table 6.6: Estimated Uses of Milled Wheat from Major and Compact Flourmills, 1996-97

Uses	Fine *atta*	White flour
Hand-made flat bread (chappati)	230	0
Household use	0	160
Biscuits, cookies and bread	0	120
Hotels and restaurants	0	100
Sweets	0	10
Semolina, vermicelli, noodles, etc.	0	6
Pizza, burger, buns, etc.	0	4
Total use (in thousand metric tons)	230	400

Source: Own estimates based on FPMU data on aggregate variables.

Relations between Wheat and Rice Prices

In spite of the problem with price data pertaining to wheat, some preliminary exercises were performed to verify if rice prices affected wheat prices. Following our exercises in Phase I, bivariate Granger causality was tested for price series on wheat and rice in Dhaka market. Based on the Akaike Information criterion (AIC), the optimal lags were found (two in both cases), which were then used in the specification for testing Granger causality. In order to specify the appropriate model, stationarity of the two series were separately checked. Wheat prices were found to be non-stationary in levels. However, both the series were found to be stationary in first differences.[11] Moreover, the two series were found to be not cointegrated. We, therefore, adopted the same model specification as in Chapters 3 and 4. The null hypothesis that rice prices do not Granger cause wheat prices (and vice versa) could not be rejected at even 10 percent level of significance. This result did not change across different sub-periods in our sample (see Table A6.2).

[11] Estimated t-statistics of ρ were respectively –2.633 and –3.713 for the wheat and rice price levels. They were –12.673 and –11.574 for the first difference.

IV. SUMMARY AND CONCLUSIONS

The wheat market is evolving fast in Bangladesh, and is increasingly being characterised by differentiated products. Even though the total quantity of wheat consumed in the economy has not increased, there have been substitutions between products at the levels of both intermediate and end produce. This chapter has shown that different agents in the Bangladesh wheat market are associated with supplies of different types of wheat. In particular, the private traders and millers who import wheat from outside the region (South Asia) supply better quality wheat that promotes product differentiation and serves better-off urban consumers. Given that the end products based on white flour and *atta* are not perfect substitutes, the private importers are less vulnerable to unanticipated policies of the government who generally confine to supply of low-quality wheat.[12]

The market for milled wheat and wheat-based products, backed up by effective demand, is still quite thin in Bangladesh. This is why private importers of bulk wheat (from outside the region) face uncertainty vis-à-vis government policies as well as other small private traders who import wheat from the neighbouring country (India). Such situations arise especially during times of high prices, as occurred during 1994-95 and 1995-96. During such times, the government may feel compelled to engage in external procurement to distribute subsidised wheat to poor consumers; and if the "prices are right", hundreds of small traders would import in small consignment (5-500 metric tons) of soft wheat via land routes from India, often via informal channel. The potential threat of such imports may however act as deterrence to oligopsonistic pricing by large private importers.

The number of private importers engaged in bulk wheat trade with countries outside the region is less than 10. The private importers have so far been doing good business. Although the investment for bulk import of wheat seems to be very high, the importers normally take advances from their customers (primarily flour millers) or combine with shipment of other commodities (e.g., oil seed). With a view to have greater flexibility

[12] Frequent unanticipated changes in the duties levied on wheat import, as was the case during the early years of import liberalisation (early to mid-1990s), would however, negatively affect private importers.

with regards to size of import, currently some importers are exploring the possibility of importing wheat jointly with Sri Lanka and India. Timing of private imports of wheat depends much on comparative price advantages and potential market demand. Most of private import arrivals take place during the months of October through March.

As noted already, a formal questionnaire survey on wheat traders was not carried out in the current phase of the study. Instead, available data have been analysed within a framework that explicitly accounts for product differentiation, and parameters used in the analysis have been estimated from information obtained through focus group discussions. Based on this analysis, two conjectures may be made about the future of the wheat market in Bangladesh. The first relates to the possibility of concentration of market power in few hands. The second relates to the implications of further opening up of the market to private traders. This chapter is concluded with brief discussion of these two conjectures.

Product differentiation do not necessarily arise in terms of differences in utilities the products may render to consumers, it also arises due to brand names associated with the same kind of products. Our observations during Phase I of the study suggested that brand-name products were entering the rural markets, posing threats to the roller mills and wheat crusher.[13] Such a trend in the product space is in conformity with the nature of bulk handling involved in wheat imports from countries outside the region. It is therefore quite likely that one segment of the wheat market, which serves the better-off consumers, will become increasingly dominated by a few traders and millers. However, it is unclear, whether the millers will choose to import directly, or, they will prefer to procure wheat from independent importers, and thereby sustain them. It is our understanding that the expansion of the domestic market for wheat and wheat-based products will demand a separation of these dual roles currently played by some major millers. Moreover, uncertainty with regards to world market prices will demand more investment on information generation, and this may force wheat importers to act more and more as subsidiaries of multinational grain firms. Such a scenario is likely to ensure

[13] See also Kranti (1994).

further separation between trading and production activities. The dynamics of this aspect of the wheat market are worth monitoring in Bangladesh since they will have implications for both the level and stability of domestic prices.

A more hypothetical question, but one which has greater implications for the expansion of private sector wheat trade, is whether the PFDS's role may be replaced by the private sector. In essence, there are two important roles that the PFDS plays: (i) the targeted distribution of wheat (which may or may not be priced) to "poor" consumers, and (ii) interventions in the market to stabilise prices. Because of the type of wheat procured and distributed, both these roles compete with the activities of the private sector engaged in trading domestic wheat. There is no doubt that the private traders cannot substitute for the PFDS in their first role, even though there are instances of such roles being played by non-government organisations (NGO). It is, however, possible to open up greater space for the private sector if the government refrains from engaging in direct procurement. Note that the import liberalisation and subsequent private sector participation has facilitated marketing of better quality wheat that are exported by major wheat producing countries. It has not yet introduced changes in domestic production of wheat. It is quite possible that increased participation of private sector in trading of wheat may open up fruitful linkage between traders, millers and local producers. The net benefit from such collaboration may further justify creating additional space for private traders in the wheat market in Bangladesh.

Table A6.1: Summary of Estimates on Wheat Uses in Bangladesh, 1996/97

(in 000 mt

Domestic			Processor and Extraction	Raw Atta 95%	Fine 85%	Flour 70%	Total Product
I On-farm	=	554	Atta Chakki/ Roller	395	118	0	513
II Govt. Procured	=	103	Atta Chakki/ Roller	73	22	0	95
III Domestic Marketed	=						
a.		301	a. Atta Chakki/ Roller	200	77	0	277
b.		301	b. Major/Compact Flour	0	115	116	231
Net Domestic	=	1260	Total Product from	669	332	116	1117
Gross Domestic		1400	Share of Total	60%	30%	10%	100%
(80% of 1996+20% of							

Imported			Processor and	Raw Atta 95%	Fine 85%	Flour 70%	Total Product
I Food Aid	=	*650*	*(60% Direct + 40%*				
a.		406	a. Atta Chakki/ Roller	270	104	0	374
b.		244	b. Major/Compact Flour	0	62	119	182
II Govt. Imports	=	*150*	*(60% Direct + 40%*				
a.		94	a. Atta Chakki/ Roller	62	24	0	86
b.		56	b. Major/Compact Flour	0	11	30	41
III Private	=	*300*	*(20% AC/RM + 80%*				
(60% of 1996+40% of a.		60	a. Atta Chakki/ Roller	40	15	0	55
b.		240	b. Major/Compact Flour	0	41	134	175
Total Import	=	1100	Total Product from	372	257	284	913
Net Wheat		2360	Share of Total	41%	28%	31%	100%
			Total Product	1041	589	400	2030
			Share of Total	51%	29%	20%	100%

Roller Mills and Atta Chakkis

Wheat Sources		Processor and Product	Raw Atta 95%	Fine Atta 85%	Flour 70%	Total Product
I On-farm Consumption	554		395	118	0	513
II Govt. Procured (PFDS)	103		73	22	0	95
III Domestic Marketed	301		200	77	0	277
Total Domestic Wheat	959	Total Domestic Wheat Product	669	217	0	885
I Food Aid (PFDS)	406		270	104	0	374
II Govt. Imports (PFDS)	94		62	24	0	86
III Private Imports	60		40	15	0	55
Total Imported Wheat	560	Total Imported Wheat Product	372	143	0	515
Total Wheat Consumption	**1519**	**Total Wheat Product**	**1041**	**359**	**0**	**1400**
		Share of Total Product	74%	26%	0%	100%

Major and Compact Flour Mills

Wheat Sources		Processor and Product	Raw Atta 95%	Fine Atta 85%	Flour 70%	Total Product
III Marketed Domestic Wheat	301		0	115	116	231
I Food Aid Leakage	244		0	62	119	182
II Gov. Commercial Leakage	56		0	11	30	41
III Private Imports	240		0	41	134	175
Total Wheat Consumption	**841**		0	230	400	630
		Share of Total Product	0%	36%	63%	100%

Table A6.2: Results on Tests of Granger Causality between Wheat and Rice Prices in Dhaka

Null hypothesis	F-values	Sig. Level
Whole sample period		
Rice prices are not Granger caused by wheat prices	0.91395	0.47158
Wheat prices are not Granger caused by rice prices	0.31375	0.904728
Pre-liberalisation period		
Rice prices are not Granger caused by wheat prices	0.19302	0.9650
Wheat prices are not Granger caused by rice prices	0.20467	0.9603
Post-liberalisation period		
Rice prices are not Granger caused by wheat prices	0.98075	0.43028
Wheat prices are not Granger caused by rice prices	0.23898	0.9449

Source: Own estimates.

CHAPTER 7: POLICY IMPLICATIONS

The overall pictures that emerges from our research into the spatial pattern of wholesale rice marketing in Phase I, and the paddy-rice marketing chain in Phase II, is one of a dynamic and well-functioning marketing system. The pricing analysis conducted during Phase I study showed that the extent of spatial marketing integration has increased at the wholesale level, while the Phase II study indicates that marketing chain are becoming shorter as traditionally intermediaries in the vertical marketing chain are bypassed. The review of wheat marketing in the last chapter also reveals, a market that is evolving fast and is become increasingly characterised by product diversification that the public food distribution system caters for inadequately. As such, the primary policy implication of this study is that Government, donors, NGOs and other agencies should seek to find ways of reinforcing the inherent strengths of the private sector marketing dynamic rather than trying to compete with it.

Our enquiries indicate three areas in which government intervention may be especially beneficial to the private sector grain trade: road transportation, inventory credit and the stability of the trading environment

Both the Phase I and Phase II surveys found that transportation related problems were of considerable concern to rice and wheat traders. Overall 36 percent of rice wholesalers and 11 percent of millers listed transportation among their top three problems. In most areas, a switch has taken place from river to road transportation driven primarily by the speed and convenience of trucks. However, the increasing levels of traffic congestion around traditional rice wholesaling markets, such as Batamtoli/Babu Bazaar, truckers' strikes, and the need to make side payments to ferry crossing (*ghat*) operates were of particular concern to traders. The decentralisation of wholesale markets in both Dhaka and Chittagong is now probably unstoppable but improvement to the road infrastructure should certainly take account of the locations in which new wholesale markets and milling clusters are developing on the urban peripheries. Given the clear importance of the North-West as procurement areas, the imminent opening of the Jamuna Bridge, and the difficult of controlling overloading of trucks, priority should be given to upgrading the capacity of road to and within the North West.

Lack of institutional credit facilities affect traders, such as paddy *aratdars* and millers, operating at the lower end of the paddy-rice marketing chain the most. To help relieve institutional credit constraints, it is recommended that the establishment of an inventory credit scheme targeted at the millers level should be investigated. Such a scheme would involve advancing loans from commercial banks to millers against the receipts of paddy stocks (most probably deposits in registered warehouse locations). Such inventory credit schemes have operated successfully in a number of other Asian countries (India, the Philippines, and Thailand) and also in some African countries (Ghana, Mali and Zambia) too.[1] Furthermore since 1989, banking legislation has been in place that allows commercial banks to lend to mills and other traders against hypothecated stocks, while there is experience of operating such a scheme at the level of farmers (BASWAP/SHO GORP) in Bangladesh. The proposal that inventory should focus on millers rather than farmers (or smaller traders) may be controversial. But since millers occupy a critical nexus in the paddy-rice marketing chain, making both cash advances down the chain and advances in kind up the chain, such a scheme would benefit other credit constrained marketing intermediaries. Millers are also at the forefront of product differentiation and the forging of direct marketing linkages in the terminal market areas. By severing some of the circularity in trade credit relations, in which millers seem to be net absorbers of credit from farmers and *aratdars*, an inventory credit scheme would also supply increasing liquidity to the private sector trade. This additional liquidity might, in turn, allow millers to forge new marketing linkages, procure greater quantities of paddy directly from farmers, and engage in more intra-seasonal storage. Since most millers' storage facilities are quite modest, it is also worth investigating whether the introduction of an inventory credit scheme might be combined with the leasing out of former public sector storage facilities to millers.

A third way in which the Government can assist the development of the private sector grain trade is by providing a more stable trading environment. To the extent that unannounced changes in procurement levels, tariffs and public sector imports are responsible for having destabilised the private sector importers' expectations, they may have contributed to the increased volatility of the cyclical price path noted in the appendix to Chapter 2. Traders'

[1] See Coulter and Shepherd (1995).

complaints of depressed markets conditions and increased competition reflect this increasing price volatility, as well as the impact of new entrants and the general decline in public sector marketing activities. With a private-sector marketing system that is spatially well-integrated, it will be increasingly difficult for Government to counter such price fluctuations via traditional buffer stock management policies. Indeed, if applied in *ad hoc* and uncoordinated fashion, such policies might further destabilise the cyclical price path. Consequently there is a need to institutionalise an information based decision making process to foodgrain management in which the private sector is involved actively. Regular assessment and dissemination on the food situation in the country, preferably generated by an independent body, might be combined with a regular forum for the co-ordination of imports which involves representatives of private sector traders and millers. Since private-sector traders are generally believed to respond more quickly to emerging food deficit situations, a higher proportion of the international trade in grain being undertaken by the private sector may serve to dampen down price fluctuations more quickly than public sector interventions. Private sector imports of wheat are also likely to be more sensitive to the quality demands of the emerging milling sector than public sector imports have traditionally been. It is important to note, however, that reliance on the private sector for foodgrain imports need not be incompatible with Bangladesh's overall goal of achieving self-sufficiency in foodgrains, since a more stable pricing environment should assist farmers in planning production in the future.

Finally it is also important to recognise that there are areas in which the private-sector grain trade is unlikely to perform well. The first of these is in the provision of foodgrains to the poor and the destitute, who will usually not have sufficient purchasing power to be of interest to the private sector. Here the PFDS and food aid (possibly monetised) must continue to play a vital role in ensuring the food security of the poor. Second, the private sector has, to date, not shown itself to be particularly concerned with developing consistent grading and quality standards. For the grain marketing system to go on developing, and in particular for trade linkages to become less personalised, it is important that standardised grades and forms of contract emerge. While improving grading standards cannot succeed unless the private sector takes them up, some public sector initiative in this area seems justified. Third, throughout this study, pricing information has been found to be problematic- -particularly at the farmgate

and retail levels. Improving the computerisation of existing price records, together with a narrowing down of the scale of price collection efforts, is essential if the government is to monitor its own activities in foodgrain markets more effectively.

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