RESEARCH REPORT

BEHAVIOUR OF MARKETED SURPLUS IN PADDY PRICE DETERMINATION IN SRI LANKA

WASANTHI WICKRAMASINGHE
NALAKA WIJESURIYA
DUMINDA PRIYADARSHANA

HARTI
Hector Kobbekaduwa
Agrarian Research and
Training Institute

Behaviour of Marketed Surplus in Paddy Price Determination in Sri Lanka

Wasanthi Wickramasinghe
Nalaka Wijesuriya
Duminda Priyadarshana

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Hector Kobbekaduwa Agrarian Research and Training Institute
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FOREWORD

A prime concern of every government is to offer a fair price to paddy farmers for their hard-earned produce. Various programs have been implemented to achieve this objective under different economic regimes with varying degree of success. However, the problem continues to persist. Paddy price fluctuation has also of significance in the event of increasing paddy production with significant fluctuation in production in the last few decades.

Dr. Wickramasinghe and the team have attempted to study the behavior of paddy surplus in the market that helps to understand the paddy price determination and to find necessary interventions and adjustments for securing reasonable price for paddy farmers. According to the study, setting a guaranteed price, direct purchasing of paddy by government to the guaranteed price, providing financial support for storage at farm level, facilitating access to technology and to credit for mill modernization are some of the government interventions. They have studied the farmer's, miller's and other marketing participants' behavior in marketing paddy surplus to elicit the paddy price determination and have come up with theoretical explanation for this behavior. Based on their findings and conclusion, some recommendations have been put forward.

I am pleased this publication is coming out at this point of time of an intense debate over the paddy price crisis in the country. I am hopeful that policymakers, researchers, students and other interested parties will make use of this information, findings and recommendations in this report.
I congratulate the researchers.

Haputhanthri Dharmasena
Director

ACKNOWLEDGEMENTS

This report is primarily depended on information gathered from farmers and market participants in the paddy sector. We wish to acknowledge the cooperation extended by them during the field survey with gratitude. The field staff, investigators and statistical staff of HARTI made a lot of efforts in the collection and processing of data for this study. We thank them all.

In the light of comments received from Dr. F. Abeyratne, Consultant UNDP Sri Lanka and Prof. Jeewika Weerahewa, University of Peradeniya, this report was improved. Helpful comments were also received from former colleagues at HARTI. The contribution of all of them is gratefully acknowledged.

We are much indebted to the earlier work by researchers —local and international— in this subject that helped build the arguments in this report and are duly acknowledged. We are grateful to the Additional Director, HARTI for encouragement and stimulus in the preparation of this report. HARTI management provided and facilitated the funding for this study. We are thankful to Director HARTI and the staff.

Finally we would like to acknowledge the support of the staff of Agricultural Resource Management Division, Marketing and Food Policy division and the Publication division. Their contribution was various.

Wasanthi Wickramasinghe
Nalaka Wijesooriya
Duminda Priyadarshana

EXECUTIVE SUMMARY

Rice/paddy price stability is one of the important policy objectives of the government in view of welfare of the rural and urban poor. Domestic paddy price fluctuations are caused by several factors. Price fluctuation is primarily caused due to the seasonality in paddy production and the fluctuation in paddy production. Being a small open economy, Sri Lankan rice market is subjected to world market rice price fluctuations that are exemplified in the paddy market too. Nevertheless, intra seasonal and inter-regional paddy price variation and the sharp drop in paddy prices with the harvest coming to the market are the most disturbing factors in paddy price stabilisation in the country. Therefore management of paddy marketable surplus is important in terms of price stabilization. Marketable surplus could be managed to stabilize prices at various levels from farmer to collector to miller by adopting various strategies. Government had been intervening to paddy markets to manage the marketed surplus and thereby stabilizing prices. However government has withdrawn its role of managing large surpluses and currently the private sector has the main function of managing the surplus. Nevertheless, it is common that the paddy prices sharply go down with the onset of harvesting calling government intervention. These paddy prices some time hardly cover the costs of production and farmers on small plots of land end up with an inadequate income for their livelihoods.

It is vital therefore to understand the behaviour of marketed surplus from farm gate up to the paddy processor/miller and the price determination. This study focuses to understand the paddy price determination in Sri Lanka considering the behaviour of marketable and marketed surplus and the marketing mechanism of different market participants. Empirical information was gathered to elicit the behavior of farmer and the other market participants that would affect the paddy price determination in regional markets. Primary data collection involved a farmer survey and market participant survey in the major producing areas.

Farm survey revealed that about 4-10 Mt and 2-6 Mt of marketable surplus is generated on average at farm-gate in major producing during *Maha* and *Yala* seasons respectively. This surplus is disposed mainly as distress sales, sales due to lack of storage and high moisture content of paddy and as price responsive sales. Majority of Ampara and Hambantota farmers disposed more than 50 percent of their *Maha* surplus soon after harvesting which is driven by large marketable surpluses, the cash needs for repayment of loans, high moisture content of paddy, lack of storage facilities, immediate cash needs and to some extent the better price prevailing at the beginning of the season. Distress sales are common in Kurunegala and Hambantota districts primarily to pay credits where small farmers are dominant. Marketed surplus is spread over a period of 3 months in Polonnaruwa and Anuradhapura districts and price responsive sales take place commonly. Moreover Anuradhapura farmers keep part of the marketable surplus

for the next season as their *Yala* season is bleak. Although farmers tend to dispose their *Maha* harvest early as possible, *Yala* harvest is stored anticipating higher price towards the end of the *Yala* season. Therefore price responsive sales are the common way of disposing the marketable surplus during *Yala*. This behaviour leads to large stocks of paddy surpluses to be available with the onset of *Maha* at the market especially from Ampara where *Maha* harvesting begins first and tends to create more inelastic supply with the onset of *Maha* in Ampara that could lead to large price drops in the Ampara area depending on the intensity of buying operation in the area.

Farmers sell their surplus to village level collectors or to millers either at farm gate/house or by bringing their stocks to the mills. It is commonly observed that millers are operative in buying paddy in Hambantota, Kurunegala, Ampara and Polonnaruwa districts while village level collectors play a prominent role in Anuradhapura and also to some extent in Polonnaruwa. Frequently large millers buy paddy at farm-gate directly sending their Lorries to the farm or through village level collector. When a village level collector is operative in buying paddy, stocks are sold to the miller through a broker and he acts as an intermediary in the marketing channel. When small to medium scale millers are operative in buying paddy, often farmers carry their stocks to the mill as in the case of Kurunegala and Anuradhapura farmers.

When the buyer side of the paddy market and their buying behaviour of marketed surplus are considered, structure of the milling industry and large scale miller's buying behaviour are main determinant factors for intra-seasonal and inter regional paddy price fluctuation according to the findings.

According to the latest information collected on milling industry in the major producing areas, there has been an expansion of milling capacity of mills and now the majority of the rice millers are medium scale based on the scale of their business. Particularly, large scale millers have all the functions from farm gate up to the consumer. Large millers have modern machineries and have adopted new technologies. A majority of the large millers own large storage facilities. This vertical integration, mechanization and use of modern technology has increased the miller's ability of buying large quantities of paddy at once and to maintain large paddy storage capacities that can influence the paddy market. This scale of the operation with increasing return to scale can increase the productive efficiency of milling operation as well.

Based on the physical concentration of the mills and the buying behaviour, few regions can be distinguished as independent regional paddy markets. Demand for paddy arising in large scale milling centred in Polonnaruwa with the supplies from major paddy producing areas in Polonnaruwa, Ampara, Anuradhapura and Kurunegala including Mahaweli areas represents the largest regional paddy market. In Polonnaruwa, 75 % of the mills are large scale and are located near urban centers in Thamankaduwa and

Hingurakgoda DS divisions. Nearly 50 per cent of the millers in Polonnaruwa purchased paddy from collectors who are operative in purchasing paddy from long distance remote areas. Large millers have adopted new technology to improve the quality of rice and to increase the efficiency of resource use. The other important regional market, Hambantota, is composed of medium scale rice mills uniformly distributed in all major producing areas. In Hambantota, farmers transport their stock to the millers in most instances and therefore collector is absent in the marketing channel. Distinct price behavior is observed in these regional paddy markets and the inter-regional price differences are mainly depend on the structure and behavior of buyer side of the market.

According to the structural explanation presented in this study, the farmer's behaviour in disposing paddy at the beginning of *Maha* season and the behaviour of large millers in Polonnaruwa district are the most determinant factors for paddy price determination in Sri Lanka.

Concentration indices measured in terms of CR4, CR8, Herfindahl and Gini coefficient do not support that milling industry in Polonnaruwa is concentrated. However, physical concentration and the cooperative decision making in Polonnaruwa regional paddy market can exert market powers that may similar to a concentrated market. Based on the findings it is imperative that large millers concentrated in Polonnaruwa exert market power during the period of peak harvesting in Ampara when the supply is highly inelastic. These large mills can exert oligopsony power as their share of purchases in the paddy market is sufficiently large that it can cause the market price to fall by purchasing less during surplus seasons and cause it to rise by purchasing more during shortages. Speculation about marketed surplus is also determinant factor for their purchasing decisions. This market power can lead to repulsion of small millers and further consolidation and expansion of large millers

If there is a competitive fringe of small buyers that compete in the paddy (input) market with few large buyers who work cooperatively, then the buyer market power of the dominant mills (firms) will be constrained not only by the elasticity of supply of the sellers in the paddy (input) market, but also by the fringe of small buyers. The more elastic the demand by the fringe, the more their purchases rise as the price falls, and the more difficult it will be for the dominant firm to exercise buyer side market power. The reduction in its demand, and hence the profits foregone, as it attempts to depress the price, will be greater as suppliers can instead substitute and sell to the fringe.

In the absence of competitive fringe of small to medium buyers with a highly inelastic supply at the peak harvesting period, oligopsonic behaviour in the paddy market is unavoidable unless government intervene to the market. However the government's

role in managing the marketed surplus by way of direct intervention has been questioned in terms of its net economics benefits.

Particularly the role of Paddy Marketing Board (PMB), the main government agency established to implement the Guaranteed Price Scheme (GPS)/ government minimum purchasing price, for direct government purchasing and maintenance of buffer stocks has diminished with liberalizing the economy in 1977. Since then the role of government intervention was gradually withdrawn in terms of stabilizing price through its buffer stock program instead; private sector was promoted by expanding their marketing functions from purchasing of paddy to retailing of rice by providing tax concessions and incentives. PMB stopped actively purchasing paddy in 1996.

Currently the government mechanism for direct intervention in terms of direct purchases to the Guaranteed Price has its limitations due to infrastructure facilities and financial hardships. Current storage capacity of PMB is around 220 thousand Mt. Lack of rice producing centers is also a challenge to PMB. The loss occurred due to long time storage and lack of adequate and quantity warehouses are also causes for wastage which is a challenge for the board.

Considering the management inefficiencies and lack of infrastructure of the main government parastatal and government's role in price stabilization, study proposes few recommendations. Importance of government interventions at the main price determining months March to April and locations particularly in the main paddy producing areas in Ampara at least to the minimum intervention is highlighted. Importance of duly considering the current processes, trends and development in the paddy marketing sector in designing government buffer stock program is also highlighted. Public- private partnership for purchasing, milling and storage of paddy is proposed to increase the competiveness of small and medium millers and, to increase the bargaining power of paddy farmers. Lack/absence of declared information on storage capacities of millers and the highly constrained access to information of large millers due to business ethics are main obstructions for further analysis on oligopsony power in the paddy market.

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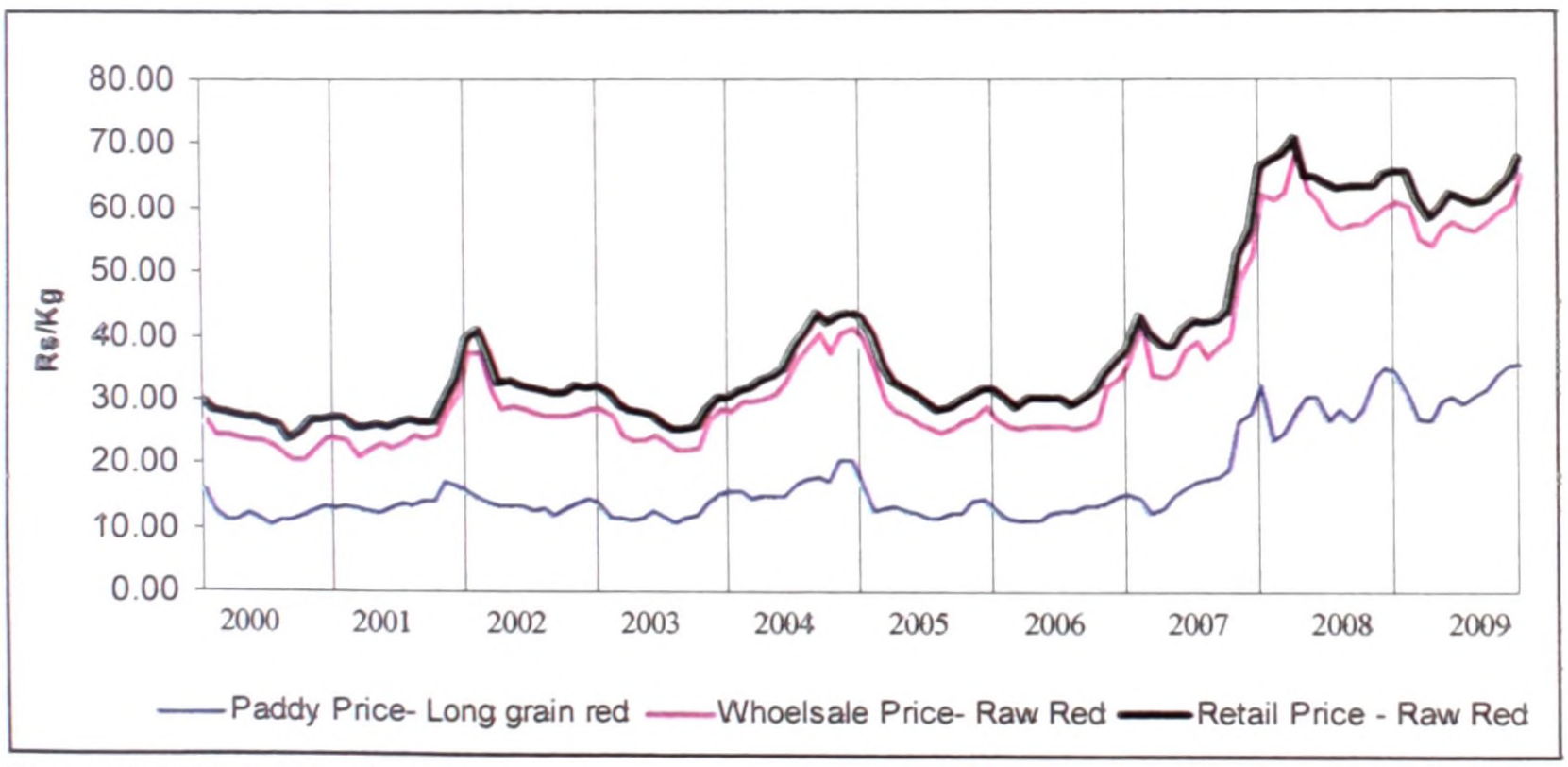
CHAPTER ONE

Introduction

1.1 Background

Large and disruptive paddy/rice price fluctuation at producer and consumer markets is a main concern of every government in view of welfare of the rural and urban poor. Therefore government considers rice/paddy price stability as one of the important policy objectives and utilizes a wide array of policy instruments to curtail price volatility in the paddy market and in the rice market. However, due to seasonality in paddy production, price fluctuation is unavoidable that management of marketable surplus becomes a main determinant of price volatility in the paddy/rice market. With the onset of harvesting, farmers start to dispose their harvest at once and there is a sharp decline in paddy prices during the peak harvesting season. These paddy prices hardly cover the costs of production and farmers on small plots of land end up with an inadequate income for their livelihoods. On the other hand, at the consumer markets, prices increase to unaffordable levels towards the end of harvest making poorer urban consumers spending more and more on their staple food.

Following figures (Figure 1.1 and 1.2) show the price fluctuation of paddy and rice during the last 10 years with monthly variation.



Source: HARTI data bank, 2010

Figure 1.1: Farm-gate Price of Long Grain Red Paddy, Wholesale Price and Retail Price of Raw Red Rice, from 2000 to 2009

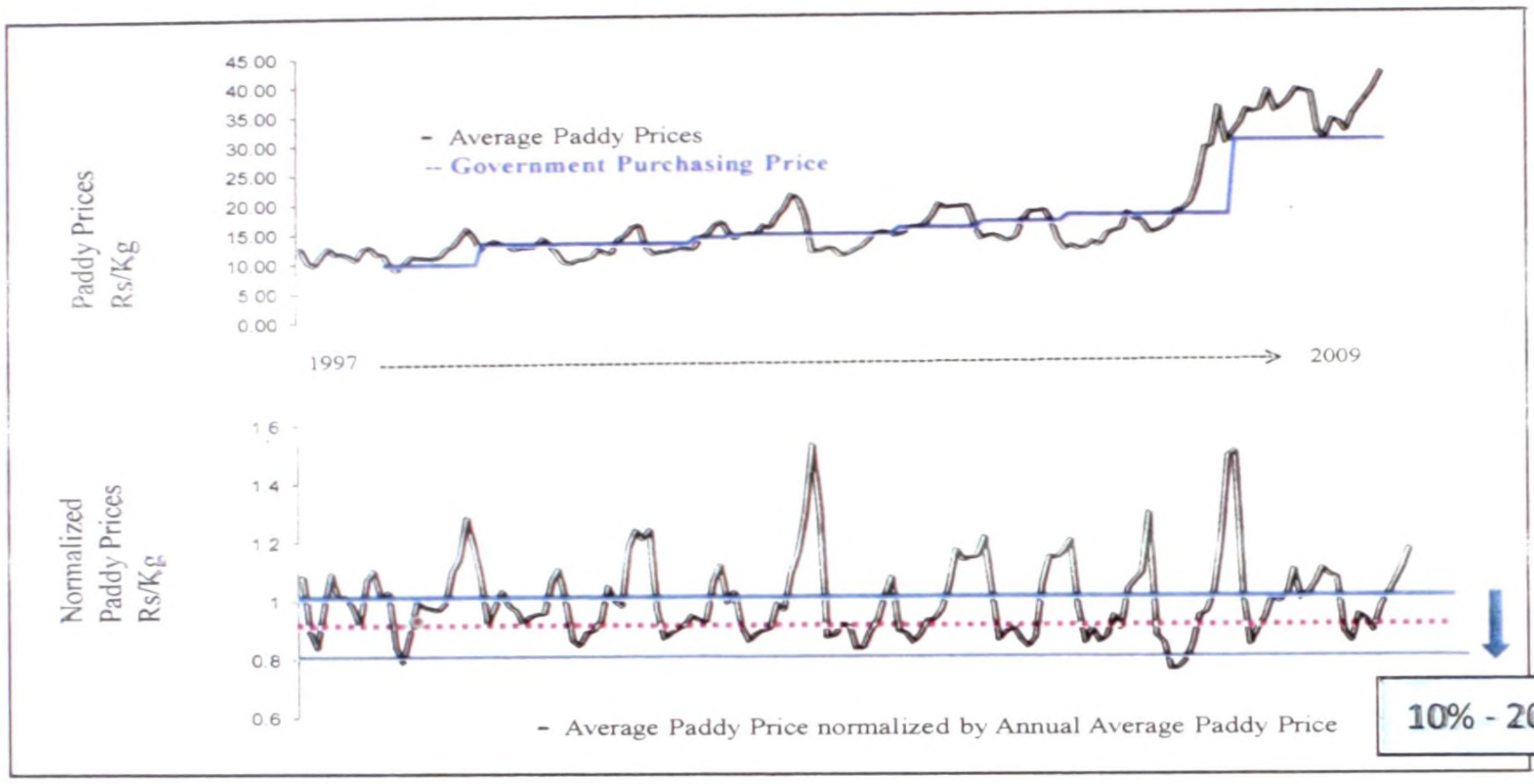
Source: HARTI data bank, 2010

Figure 1.2: Farm-gate Price of Short Grain Paddy, Wholesale Price and Retail Price of Samba, from 2000 to 2009

The increase in rice production in the country that was largely brought by new improved varieties caused large fluctuations of supply with the area and yield variations due to weather changes. These supply fluctuations that are aggravated by the changing import prices and taxes, cause price fluctuations affecting the poor consumer and the farmer. Hence government intervention in paddy/rice marketing has been in operation since early 40s to stabilize paddy/rice prices in the country. Several policy measures have been taken to stabilize the paddy/rice prices in the country. Among them administrative pricing such as Guaranteed Price Scheme (GPS)/government minimum purchasing price, minimum/ceiling price for rice, direct government purchasing and maintenance of buffer stocks, establishing marketing boards, state intervention in providing credit, storage facilities to farmers and millers are some of the government interventions. However, the net economic benefit of government price stabilization interventions has been commonly questioned by economists (Newbery and Stiglitz, 1981; Krueger et al., 1988; Knudsen and Nash, 1990).

Since the introduction of GPS, government has been intervening in the paddy market by direct purchasing of paddy at the peak harvesting period through its parastatals such as PMB, CWE, Cooperatives and, FOs at an administered price to dampen prices dropping sharply in the paddy market. The administered price i.e. Government Purchasing Price (GPP) has been revised according the market price trend, it has not been largely effective in stabilizing prices as shown in the Figure 1.3. Monthly paddy prices largely fluctuate around the year that normalised paddy prices are as low as 10 – 20% of the annual average price during peak paddy harvesting month according to figure 1.3.

Instability of prices continued to prevail over the period and Government purchasing price; GP has been a nominal price during the recent 2008 world price crisis.



Source: Department of Census and Statistics, 2010

Figure 1.3: Monthly Paddy Prices Compared with Government Purchasing Price of Short Grain Paddy and Normalized Paddy Prices[1]

Supplying concessionary credit to millers and paddy assemblers at the peak harvesting is one of the other policy instruments adopted by the government in the recent past to increase the competition among millers and paddy assemblers in order to curtail the sharp price drops. Government also attempts to promote managing this surplus at farm level. Several programs such as *Alevisaviya, Vee Surakum* were implemented time to time to encourage farmers to store their surplus to enhance the bargaining power at farm level. Nevertheless, the decision by paddy farmers to market their surplus or to store it to sell later is depended on several factors. In the last few seasons, a trend is observed in storing paddy surplus for future sales in major producing areas. It is shown that fertilizer subsidy program and guaranteed price have been the positive factors encouraging farmers to store their surplus and to enhance the bargaining power of paddy farmers (Wickramasinghe et al., 2010). However, the price interventions alone have not resulted in reducing fluctuations in the paddy market. It seems there are other factors related to management of marketed surplus that can influence price determination in the paddy/rice market handled by a number of market participants from paddy assembler to rice retailer.

[1] Normalized paddy price = Monthly paddy price/Annual average paddy price

With the declining of paddy purchasing activities by the government over the years, the private sector has taken over marketing functions of paddy/rice trading system in Sri Lanka. Assembly agents/ collectors, brokers, small scale operators and rice millers have been involved in purchasing paddy. Due to lack of storage facilities and finances, many paddy assemblers operated in paddy producing areas continued to hold a very few stocks and usually they keep stocks until transferred to the millers. Thus storage is primarily handled by large scale private millers, one of the main marketing functions in paddy/rice trade. Although Paddy Marketing played a dominant role in storage by owning a number of high capacity stores in storing paddy, at present government owns a very limited storage facilities. Consequently, storage, the earlier function of PMB to maintain paddy stocks to control paddy prices is now in the hands of large scale private millers.

Marketable surplus could be managed at various levels from farmer to collector to miller by adopting various strategies to stabilize prices. Some studies have implied whether large scale millers have gained the market power through the function of storage and have resulted large paddy price fluctuation in the Sri Lankan paddy market. An earlier study by Wickramasinghe & Dharmaratne (1999) have shown that in the paddy/rice price determination in Sri Lanka, large scale millers are at an advantageous position in exercising market power both in the rice market and paddy market. Thus, regulation of behaviour of market participants in managing the marketable surplus is vital for paddy/rice price stabilization.

1.2 Objectives

Due to the reason that a comprehensive study has not been undertaken to understand the price determination process of paddy in Sri Lanka considering the behaviour of marketable and marketed surplus and the marketing mechanism of different market participants, this study focuses on following specific objectives. It is expected the study would elicit the price determination process of paddy in Sri Lanka to help policy makers to reduce price volatility in the paddy market.

Specific Objectives

1. To estimate the marketable surplus, marketed surplus at farm level
2. To identify the buyers of marketed surplus and the purchase mechanism operated by them versus the disposal mechanism available to producers.
3. To investigate the factors affecting the determination of marketed surplus and storage decisions by paddy farmers
4. To study the behavior of market participants and to elicit the price determination process of paddy in Sri Lanka

5. To make recommendations for price stabilization to increase the welfare of the rural and urban poor

1.3 Methodology

The study was based on existing secondary data, studies reviewing the market literature and primary data collected through rapid appraisal and questionnaire surveys. Empirical information was gathered to elicit the behavior of farmer and the other market participants that would affect the paddy price determination in regional markets. Primary data collection involved a farmer survey and market participant survey in major producing areas.

Primary Data Collection

Target group discussions, key informant interviews and structured questionnaires were utilized to collect primary information. Farmers, collectors, village farm organizations, millers were the focus group for primary data collection. Information on the pattern of marketing prevalent at the farm/village level or the disposal mechanism in the area, the buyers of marketed surplus and the purchase mechanism operated by them, factors affecting the determination of marketed surplus and storage decisions by paddy farmers and farm gate price determination was collected for the 2009/10 *maha* season and 2010 *yala* season.

The year 2010 recorded the highest ever production in the country by then. Both 2009/10 *maha* season and 2010 *yala* season recorded a significant yield increase compared to other seasons. Price incentives through better paddy prices and subsidized fertilizer prices caused increased acreage under paddy and increased input use resulting in significant yield increase (HARTI, 2011).

The study focused on main paddy producing areas including surplus areas and areas where major regional paddy markets prevail (Annex 1). Accordingly, Ampara, Polonnaruwa, Anuradhapura, Hambantota and Kurunegala districts were chosen as sampling districts and the following DS divisions were surveyed.

1. Ampara – Dehiaththakandiya, Akkaraipaththu, Samanthurai
2. Polonnaruwa – Thamankaduwa, Medirigiriya, Dimbulagala
3. Anuradhapura – Galenbindunuwewa, Thambuththegama, Padaviya
4. Hambantota – Tissamaharama, Ambalantota, Hambantota
5. Kurunegala – Nikaweratiya, Galgamuwa

Sampling design for the primary survey including selection of villages, and selection of farm households for farmers' survey followed a random sampling procedure. The farmer

survey was designed such that questionnaire survey with 60- 65 farmers from each DS division using a structured questionnaire was held while 10-15 collectors, millers and other market participants were interviewed individually to collect information related to market structure, marketing channel and the behavior of market participants in managing the marketed surplus. A field survey was carried out from August to September 2011.

Secondary Data/Information Collection

Main data bases used for the study comprises HARTI market information data base and the data from the Paddy Marketing Board. Secondary data on millers' daily production and other related information were collected from Divisional Secretariat offices and banks. However, these data are not verified by those authorities and are not reliable.

1.4 Organization of the Report

Several price stabilization policies implemented by successive government from its first inception in 1948 with the introduction of Guaranteed Price scheme (GPS) for paddy until the intervention by the government during 2010 *Maha* season are reviewed in the second chapter in view of its effectiveness in stabilizing paddy/rice prices. Third chapter provides information relating to the size of marketable surplus, its disposal mechanism, market participants involved in purchasing and the farmer's behavior in handling their surplus. This chapter tries to gather empirical evidence on the behavior of supply side of the paddy market. Forth chapter deals with organization of paddy processing/milling industry representing the demand side of the paddy market. Structure of the milling industry, miller's behavior and conduct are studied in this chapter. Fifth chapter develops a structural model to understand the paddy price determination in regional paddy markets. The last chapter, chapter six presents the findings and the conclusion for possible interventions to stabilize paddy prices in Sri Lanka.

CHAPTER TWO

Price Stabilization Policies in Sri Lanka and Government Parastatal Agencies for Paddy Purchasing

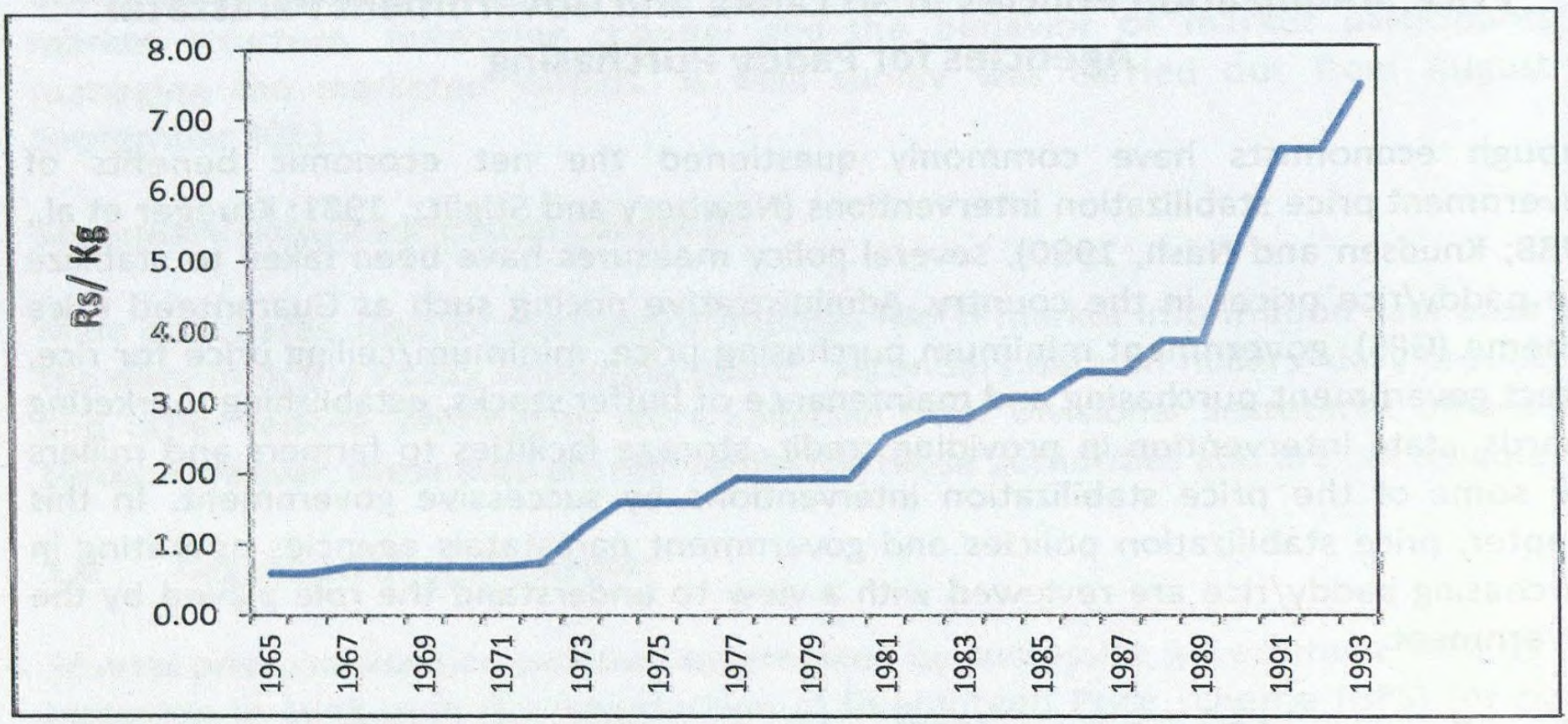
Though economists have commonly questioned the net economic benefits of government price stabilization interventions (Newbery and Stiglitz, 1981; Krueger et al., 1988; Knudsen and Nash, 1990), several policy measures have been taken to stabilize the paddy/rice prices in the country. Administrative pricing such as Guaranteed Price Scheme (GPS), government minimum purchasing price, minimum/ceiling price for rice, direct government purchasing and maintenance of buffer stocks, establishing marketing boards, state intervention in providing credit, storage facilities to farmers and millers are some of the price stabilization interventions by successive government. In this chapter, price stabilization policies and government parastatals agencies operating in purchasing paddy/rice are reviewed with a view to understand the role played by the government.

2.1 Guaranteed Price Scheme (GPS) and Its Operation before 1977

In 1948, the government introduced the Guaranteed Price Scheme (GPS) which offered a guaranteed price to producer for paddy. Initially the scheme was carried out at village level through cooperatives that were charged with buying and storage of paddy and the guaranteed price was set at a price well above the free market price. A substantial subsidy was built into the GPS to encourage farmers to increase output (Barker et al., 1985) and GPS policy intended to achieve the objectives a) to assure the producers (of) fair prices and ready market for their produce, b) to stimulate the production of food crops consumed in the country and c) to replace food imports by locally produced foods with the long-term goal of food self-sufficiency. Several government departments such as the Department of Agrarian Services, Department of Marketing Development and the Department of Cooperative Development were responsible in implementing the scheme.

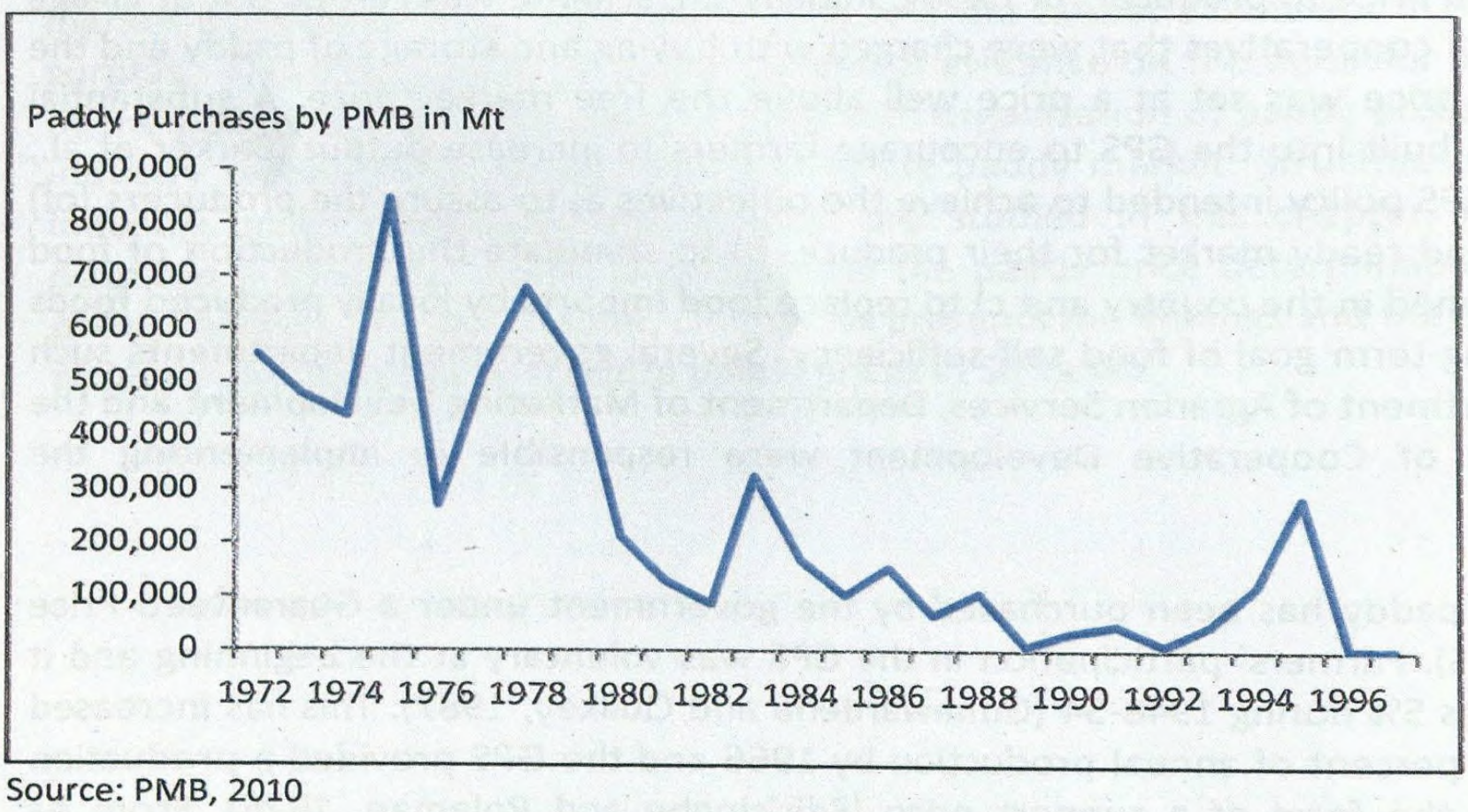
Since 1948, paddy has been purchased by the government under a Guaranteed Price Scheme (GPS). Farmers' participation in the GPS was voluntary at the beginning and it was as low as 5% during 1948-54 (Gunawardena and Quilkey, 1987). This has increased to about 50 percent of annual production by 1966 and the GPS provided a production incentive in the form of a support price (Edirisinghe and Poleman, 1976). From its inception, the nominal price offered by the GPS has been rising without any downward movements (Figure 2.1). Although the GPS purchased an average of 50 percent of annual production prior to 1966 indicating clearly the prominence of the public sector in domestic trade of rice, a sudden drop in the volume of purchases took place thereafter

(Figure 2.2). This had been induced by the reduction of the quantum of rationed rice at the end of 1966.



Source: PMB

Figure 2.1: Guaranteed Price of Paddy (Rs/Kg), 1965 -1993



Source: PMB, 2010

Figure 2.2: Paddy Purchases by PMB 1972- 1996

Government reduced the ration quantity from two measures to one measure in 1966, the demand for rice from the open market increased resulting in a large increase in the consumer price. As a consequence private sector rice demand expanded enabling private traders to offer farm prices higher than the guaranteed price (Samaratunga, 1984) and after 1966, open market prices rose above the GPS price. However, with its large purchasing capacity the GPS functioned very effectively as a floor price scheme (Samaratunga, 1984). If the GPS price was below the open market price of paddy, it was more rational to a farmer to sell his produce in the open market. As a result government purchases as a percentage of total rice production reduced substantially.

In 1971, the Paddy Marketing Board (PMB) was set up by an Act of Parliament (No. 14, 1971) as the sole marketing outlet for paddy in Sri Lanka and the PMB was vested with monopoly powers in procurement and sale of paddy. This act allowed the PMB or their agents to have the sole authority in collecting paddy from the farmers, store, process and distribute the milled rice to the Food Commissioner's Department (FCD) in order to distribute to the consumers under the rice rationing scheme. In January 1972, marketing functions were taken over by the Paddy Marketing Board (PMB) by purchasing paddy of the 1971/72 *Maha* season.

Table 2.1: Nominal Farm Prices and Procurements of Rice under the GPS, 1965-1976

Year	Guaranteed Price of Paddy (Rs/MT)	Guaranteed Price of Rice Equivalent (Rs/MT)	Open Market Farm Gate Price of Rice (Rs/MT)	Procurement under the GPS ('000MT	Procurements Ratio of the GPS (Percent)
1965	570	840	810	484.26	63.30
1966	570	840	800	586.91	61.30
1967	665	980	972	322.79	23.37
1968	665	980	1133	312.35	22.72
1969	665	980	1089	287.21	17.88
1970	665	980	1059	549.26	37.34
1971	665	980	1032	685.44	52.17
1972	715	1050	1059	550.18	41.85
1973	1190	1750	1731	478.37	28.89
1974	1570	2310	2943	435.76	37.90
1975	1570	2310	2989	241.73	19.44
1976	1570	2310	2669	268.81	15.64

Source: PMB, 2010

The co-operatives collected paddy from the farmer on behalf of the PMB, which hired private millers to process the paddy. The millers handed over the rice to FCD, which in turn issued it to the co-operatives for distribution to the consumers on a ration. During

1972-1976 period rice market had technically been a monopoly of the public sector agencies. The paddy marketing board had the sole responsibility of domestic procurement under the GPS. Nevertheless in practice government procurement did not increase to pre-1966 levels because rice ration supplement was not provided at such concessionary price prior to 1966 (Table 2.1). Also it is evident that the withdrawal of the ration led to very low procurement under GPS, despite continuously increased levels of GPS price. In fact it has been empirically shown that the price of GPS had been playing only a secondary role in determining GPS procurement and the major determinant was the ration scheme that effectively changed the demand for rice, and hence the price of same in the open market (Samaratunga, 1984). Apart from the above marketing functions; collection, milling and distribution of paddy/rice, the PMB is also involved in maintaining a "Buffer-Stock Scheme" for rice by using its regional warehouses in each region. This was primarily carried out with an aim of stabilizing rice prices in the market.

Up to 1973, the price under this GPS was higher than the c.i.f. value of the paddy equivalent of imported rice. However, this price structure was reversed in 1974 (Yoshimura et al., 1975). With this reversal, collection of paddy by the government organizations started to decline (Table 2.1).

2.2 The Role of Government Marketing of Paddy after 1977

The role of government in marketing paddy/rice was changed with the introduction of economic liberalization policies in 1977. In 1978, the PMB Act was amended and allowed the private sector to involve in marketing rice based on competition. In March 1978, the rice rationing system was abolished (Gunawardena and Quilkey, 1987). Liberalization of the rice marketing and the abolishing of the rice-rationing scheme, the need for the government to play a purchasing role began to diminish and there was a dramatic reduction in the government's market share in purchasing paddy. The procurement and distribution of paddy was largely taken over by the private sector in the mid-eighties. The role of the PMB was reduced to price stabilizing during bad seasons. Although PMB purchases were about 5% countrywide in the 1980s (Table 2.2), its contribution in the main rice producing districts was above 65% (Dharmaratne and Hathurusinghe, 1999).

The import of paddy earlier handled by the Food Commissioners Department was handed over in 1988 to three offshore companies functioning as bondsmen. Rice importing was brought under a licensing scheme and rice imports were subjected to tariff regulations after 1994. However, in times of crisis in the domestic rice production, the government has given duty waivers to importers and it is evident in many occasions that the ad-hoc waiver of duty leads to a glut of rice in the local market.

Table 2.2: Procurements of Paddy under the GPS, 1977- 1993

Year	Guaranteed Price of Paddy (Rs/MT)	Procurement Under the GPS (MT)
1977	1903	512,350
1978	1903	674,967
1979	1903	538,728
1980	1903	211,379
1981	2498	127,719
1982	2736	83,830
1983	2736	845,944
1984	3035	168,684
1985	3035	119,153
1986	3399	153,532
1987	3399	64,234
1988	3833	105,049
1989	3833	5,046
1990	5271	31,139
1991	6517	44,368
1992	6517	6,539
1993	7427	45,993

Source: PMB, 2007

Beginning of 1990, PMB had taken a decision to purchase paddy at competitive prices above the guaranteed price. Along with that decision, PMBs involvement in purchasing paddy showed a six-fold increase to 31,000 MT in 1990 over the purchases of 5000 MT in 1989. The guaranteed price of paddy was revised upward in 1993 to Rs.155 per bushel (Rs.7427 per MT) and remained until 1996.

2.3 Operation of GPS after 1996

Since 1996, PMB has not actively participated in purchasing paddy. In 1997, PMB has not purchased any paddy as the state relied farmer organizations to purchase paddy. These farmer organizations have also utilized some of the PMB stores in storing paddy. The CWE entered the paddy marketing activities during the 1996/97 *Maha* season for the first time. All operations of the PMB, including purchasing of paddy at the farm gate, paddy milling and distribution of rice through its retail outlets and cooperative societies have been dismantled since September 1999.

Table 2.3: Purchasing Price of Paddy by the Government during the Period of 1998-2008

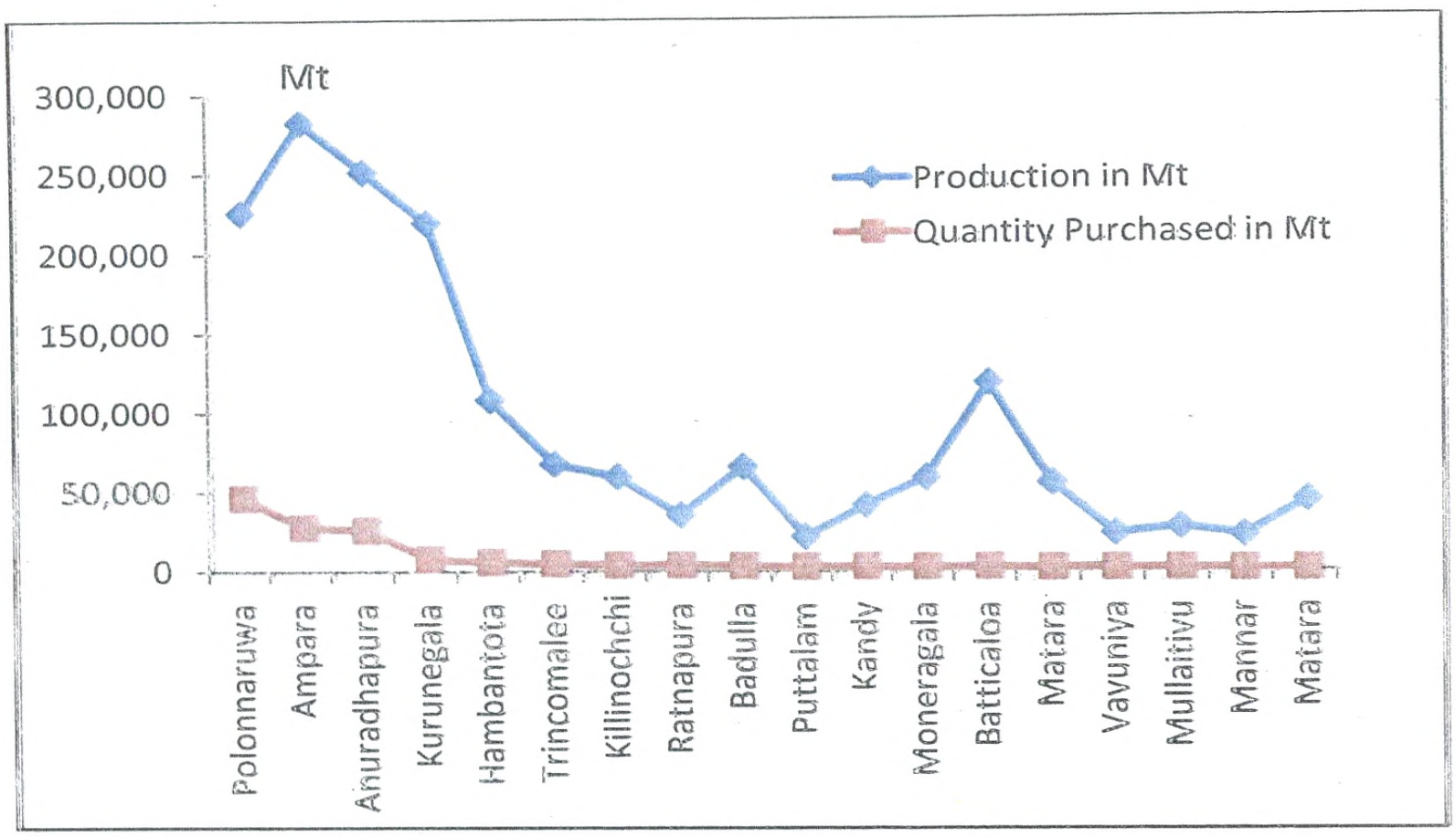
Year	Rice Category	GPS (Rs/Kg)	Purchasing Price (Rs/Kg)	Purchasing Authority
1998	Nadu	7.00	9.00	Cooperative Wholesale Establishment
1998	Samba	7.00	9.50	
1998	Red	7.00	10.00	
1999	Nadu	7.00	10.00	Cooperative Wholesale Establishment
1999	Samba	7.00	13.00	
1999	Red	7.00	12.00	
2000	Nadu	7.00	10.00	Cooperative Wholesale Establishment
2000	Samba	7.00	12.00	
2000	Red	7.00	13.00	
2001	Nadu	12.50	13.00	Cooperative Wholesale Establishment
2001	Samba	13.50	14.00	
2001	Red	12.50	13.00	
2002	-	13.50-14.50	13.50	
2003	-	13.50-14.50	13.50	
2004	Nadu	14.50	15.50	Cooperative Societies, Agrarian Centers and Farmer Organization
2004	Samba	15.50	16.50	
2005	Nadu	15.50	15.50	Cooperative Societies, Agrarian Centers and Farmer Organization
2005	Samba	16.50	16.50	
2006	Nadu	15.50	15.50	Agriculture Production & Marketing Authority
2006	Samba	16.50	16.50	
2007	Nadu	16.50	16.50	Agriculture Production & Marketing Authority
2007	Samba	17.50	17.50	
2008	Nadu	20.00 (*Maha*) 28.00 (*Yala*)	28.00	Agriculture Production & Marketing Authority
2008	Samba	22.00 (*Maha*) 30.00 (*Yala*)	30.00	
2009	Nadu	28.00	28.00	Agriculture Production & Marketing Authority
2009	Samba	30.00	30.00	

Source: HARTI (2010), PMB (2010)

Private sector dealers were allowed to operate on a competitive basis in purchasing paddy from farmers, paddy milling and distribution of rice. Although a proposal was submitted in the Parliament to dissolve the PMB, majority of parliamentarians opposed the move and the PMB existed as an inactive institution.

However, state intervention in the paddy/rice market was maintained via the CWE, which was involved in the functions of purchasing, milling and distribution of rice through retail outlets of the CWE, and appointed private sector franchise agents. CWE and the farmer organizations continued to purchase paddy on a competitive price above GPS (Table 2.3). MPCSs purchased paddy through the co-operative shops located island wide hence, their network was bigger than that of the CWE. The number of MPCSs that were involved in paddy purchasing has increased from 55 in 1996/97 to 101 in the year 2000. Similarly, the number of co-operatives involved in paddy purchasing increased from 210 in 1997 to 608 in the year 2000 (Rupasena and Ravichandran, 2000). In addition to the above government-based organizations (Table 2.3), MARKFED (Sri Lanka Co-operative Marketing Federation Ltd.) had also started purchasing paddy from 1998. MARKFED had purchased samba varieties directly from the farmers in Polonnaruwa, Hingurakgoda and Thalawa areas. It also owned a mill with a capacity of 20,000 Kg per day and the rice was sold through its wholesale and retail outlets. Even though, the purchases by these organizations had increased from 1997 to 2000, the amount purchased was insignificant compared to that of the total production. It had purchased only 1,290 mt of paddy in the year 2000 (Rupasena and Ravichandran, 2000).

In the year 2006 a new institution was setup under the name of Sri Lanka Agri Products Marketing Authority (AP&MA) and it was entrusted with carrying out paddy purchase. This authority was functioned under the Company Ordinance. Government paddy purchases increased with the establishment of AP&MA and about 10% of the 2005/06 *Maha* production was purchased by the government in major producing areas (Figure 2.3). Carryover stocks from successful 2005 *Yala* and the increased production during 2005/06 *Maha* created an increased paddy supply in the market that urged a mechanism for government paddy purchasing to control paddy prices.



Source: Food Situation Outlook,HARTI, 2006

Figure 2.3: Government Paddy Purchases 2005/06 *Maha*

Paddy Marketing Board was re-established and it started purchase of paddy by 2008. In reinstituting the PMB Act it is pointed out the need of a state sector institute responsible for the protection of food security in the island and leaving the paddy and rice market totally free from the state entrepreneurship is not conducive for the country (PMB, 2010).

PMB operation during the year 2010 was significant. The year 2010 recorded the highest ever production in the country. Due to the area expansion and the yield increase, paddy supply increased, calling for government intervention. The guaranteed price was set at 28.00 -30.00 Rs/kg. During field survey of the study, PMB operation at district level was recorded and is presented in the Box 1.

Box 1: PMB Operation during the Year 2010

This information is based on field survey during the study period.

Within the study time period the PMB operation was significant with the excess paddy in the market and the respective decline of the paddy prices.

At the beginning of 2009/10 *Maha* season, PMB was significantly active in Polonnaruwa district than other paddy producing areas. Nearly 10-14 PMB stores were established and 2000 kg of paddy were bought from each farmer from 2009/2010 *Maha* harvest at Rs.30.00 per kg. Before PMB purchases prices had declined to Rs.20.00-22.00/nadu kg, Rs.23.00-25.00/Samba Kg. Immediately after the PMB purchases, open market prices increased to Rs.23.00-24.00/Nadu Kg and Rs.25.00-26.00/samba Kg. Then the purchases were suspended for some time and resumed towards end of *Maha* harvest and the beginning of *Yala* harvest again by purchasing 1000/kg of paddy from each farmer to balance the paddy market prices due to excess production and respective lower income of the farmers. Particularly, PMB paddy buying programme was largely influential in increasing paddy prices with the consecutive excess supply from the two seasons.

In Kurunegala, in between *Maha* and *Yala* season, specially close to *Yala* (2010) harvesting paddy price decreased to Rs.18.00/kg (nadu). Therefore farmers who stored paddy had to face an unexpected situation. Due to that reason government purchased 1000 kg from each farmer, considering it as intermediate season. With purchasing of *Yala* harvest by the PMB under government paddy purchasing programme price of paddy increased in a considerable manner. PMB operated 9 purchasing centers in North Western division and in Nikaweratiya there was only one paddy purchasing center of PMB which was located in Millagoda. Farmers living near the area tend to sell their paddy to PMB.

Many farmers in the village area sell their paddy stocks to small scale millers and collectors. As farmers sell paddy just after harvesting they cannot sell their paddy to PMB because of high moisture content. On the other hand farmers claimed that PMB do not start its operations 3-4 weeks past harvesting. If farmers hope to sell paddy to PMB they have to delay recovery of harvesting cost until PMB starts operations.

PMB activities were significant in Anuradhapura district too and nearly 22 PMB stores were established and 1000kg of paddy were bought from each farmer from 2009/2010 *Maha* season harvest. But after one month, PMB stopped its operations. As the prices dropped to Rs.20.00-24.00/kg samba, PMB started buying 1000kg additionally. As a result, paddy prices went up, according to farmers. PMB operations continued during *Yala* harvest as well.

In the Eastern province, 13 PMB purchasing centers had been established. In Hambantota, PMB activities were very minimal. According to the farmers' response, selling paddy to the millers even at a relatively low price is advantageous for them rather than selling to PMB as miller comes to the farm gate in most instances in Hambantota.

According to farmer responses, PMB purchasing programme (additionally buying of 1000kg) was helpful to farmers who stored paddy expecting a favourable price. Most of the farmers had paddy stocks due to high prices prevailed in the previous season (2008/2009 *Maha*). But the prices unexpectedly dropped as a result of the higher supply from all major producing areas. PMB paddy purchasing programme assisted in controlling the paddy prices.

Farmers viewed that the GPS paddy buying procedure should be systemized and should be a timely intervention with minimizing practical operational and administering problems. Most of the farmers tend to sell their paddy to millers and collectors without selling at PMB stores due to the existence of traditional problems in the buying process like lack of enough storing capacity in PMB stores, 14% or less moisture rate requirement, store managers giving priority to large scale collectors and millers over famers, a long waiting time at the stores and delay in recovery of money from bank. As a result of these difficulties farmers sell their paddy and millers and collectors at a lower price.

Source: Field survey, 2011.

2.4 Strengthening of the Private Sector for Price Stabilization

With the liberalization of the economy after 1977, the private sector was given the main role to carryout marketing functions of the paddy/rice economy. With the private sector gradually taking over the marketing functions, they were given several incentives and barriers were removed. To improve the storage capacity of the private sector, high capacity stores of PMB were given to the private sector for storing paddy. Liberalisation of imports enabled millers to obtain necessary machinery and spare-parts without hindrance. Rice milling capacity improved. Millers were given loan facilities with extended repayment periods. In 2004, agricultural machinery was exempted from VAT.

2.5 Provision of Credits to Farmers for Paddy Storage

2.5.1 *Alevisaviya* (Support for Marketing) Programme -2002

This program was introduced to support farmers to have a better price for their paddy. This program was implemented under the supervision of a committee. The supervision committee comprised Grama Niladhari, an Agricultural Research and Production Assistant, a Samurdhi Development Officer, Chairman of farmer organization and Samurdhi group leader. Under this program, the Samurdhi Bank provides the farmer a loan worth 2/3 of his production. The production was valued giving a price for samba rice Rs.12.00/kg and for Nadu Rs.10.00/kg. Samurdhi Bank provides a loan that should be paid back within three months. Samurdhi Manager should approve the loan and annual interest rate is 24%. Agricultural Research and Production Assistant arranges all

the activities involved. After obtaining the loan, the farmer keeps his production in a store managed by the committee until the price increases. The key of the store is with the committee. After finding a buyer, farmer should ask the committee to sell his paddy. However, this system did not work well as Samurdhi Banks lacked finance.

2.5.2 Paddy Protection (*Vee Surekum*) Programme

This program is also similar to Alevisaviya program where the Govi Jana Bank issues the loan at an 18% annual interest. The loan should be repaid within 3 months. To obtain this loan, FO and Agricultural Research and Production Assistant intervene and only farmers who are members of Govi Jana Bank can receive this loan. After obtaining the loan, the farmer should store paddy in his house and the key of the store should be handed over to the Agricultural Research and Production Assistant. Within three months, the farmer should find a buyer and tell the relevant officers to sell the paddy. The responsibility is with the farmer. If the farmer does not have proper storage facilities, he can store paddy in a cocoon, a cover used for storing paddy, of ASC. Then the responsibility is with Agrarian Services Officer. But the farmer should find a buyer. In this case, the farmer is paid 75 percent of the value of his produce considering price for Samba is Rs.12.00/kg and for Nadu Rs.10.00/kg. In some cases, Rs.40,000.00 per farmer was given under this program. Farmers say that if they could obtain this money before harvesting they would not have to borrow from village collectors. For harvesting they need money and village collectors lend money on the agreement of repaying the loan in exchange of paddy.

However some farmers lost their paddy during storage, as rats have damaged the cocoon and rain water had seeped into the cocoon (cocoon is kept outside). For storing in the cocoon, 1.75 percent of the production is charged per month. Although, this kind of program is important for protecting the marginalized farmer from middleman, it has not been successful due to some shortcomings mentioned above. To obtain benefits from this program, the farmer should be a member of the Govi Jana Bank. However, according to the information reported, members of a Govi Jana Bank relevant to a particular ASC division were less than 10 percent of total farmer population in that division. Farmers who received money under this program during the *maha* 2002/2003 faced difficulties in selling their paddy at a higher price than expected to cover the loan. After *maha* season of the previous years, paddy prices increased. But, in 2003, it did not increase and consequently farmers have thought of not storing paddy under this program.

2.6 Concluding Remarks

One of the objectives of government intervention in commodity markets is to raise farm-gate prices during the peak harvesting period and the surplus producing seasons and thereby stabilizing prices. It is common that the paddy prices sharply go down with

the onset of harvesting at the time when farmer's requirement for liquidity is at the peak for repayments of owes and dues. Thus increasing and maintaining farmer's net income, successive governments have implemented price stabilizing policies from 1940s with the introduction of Guaranteed Price scheme (GPS) in 1948 for paddy. Several government parastatal agencies were involved in instrumenting the GPS such as Paddy Marketing Board (PMB), Cooperative Wholesale Establishment (CWE), Agriculture Production & Marketing Authority (AP&MA), Cooperative Societies, Agrarian Centers and Farmer Organization.

Before 1966, government purchased almost the marketable surplus which was more than 60 percent of the paddy harvest from farmers under GPS to implement the rice ration scheme in the country. After reducing the ration quantity in 1966, the demand for rice from the open market increased resulting in a large increase in the consumer price. As a consequence, private sector rice demand expanded enabling private traders to offer farm prices higher than the guaranteed price and the guaranteed price became more of an in-effective floor price. After liberalizing the economy in 1977, the role of government intervention was gradually withdrawn in terms of stabilizing price through its buffer stock program instead the private sector was promoted by expanding their marketing functions from purchasing of paddy to retailing of rice by providing tax concessions and incentives. By late 1990s the role of government intervention became minimal and for some years it was insignificant. Since 1996, PMB had stopped actively purchasing paddy. Throughout this period market equilibrium price prevailed above the GPS and GPS had no effect in the market. During 2000 – 2005 paddy prices dropped below the GPS. Nevertheless there was no mechanism to implement the policy that called for government intervention in paddy purchasing under GPS. Attempts were also made during 2000 - 2003 to increase the storage capacity of farmers through provision of credits aiming for a better price for farmers. But these programs did not show any success proving it to be uneconomical and non-feasible. Currently almost the entire paddy marketing is handled by the private sector while GPS being a nominal policy instrument. Yet, the year 2010 recorded the highest ever stock of paddy purchased by PMB in the recent time and it was 4 percent of the total harvest. This intervention was effective in raising the open market farm-gate prices during the peak harvesting period.

CHAPTER THREE

Behaviour of Paddy Marketed Surplus in Major Producing Areas during 2010

This chapter gives an analysis of marketable surplus and how it created a price effective market supply in sample locations in major producing areas during 2009/10 *Maha* season and in 2010 *Yala* season. First, marketable surplus and marketed surplus at farm level in various occasions are estimated. The pattern of marketing prevalent at the farm/village level or the disposed mechanism in the area is next described. The main buyers of marketed surplus and the purchasing mechanism operated by them are identified. It also investigated the factors affecting the determination of marketed surplus and storage decisions by paddy farmers. In the final section, the market participants and the marketing channel up to the processor are derived from different study locations.

3.1 Marketable Surplus and Marketed Surplus

Marketable surplus and marketed surplus are two terms that are interchangeably used when disposing of the harvest is concerned. The term 'marketable surplus' is defined as the residual left with the producer after meeting his requirements for family consumption, farm needs and payment-in-kind to casual and permanent labour, the landlord, artisans and others (Moore et.al., 1973). There marketable surplus may be termed as an *ex-ante* concept referring to the surplus planned to be marketed. A certain amount of value judgment is involved in the measurement of marketable surplus.

Marketable Surplus = Production – (consumption needs + seed requirement + payment in kind + wastage)

Marketed surplus is an *ex-post* concept referring to the actual amount marketed during a certain period. Marketed surplus is therefore the quantity of output the farmer actually sells irrespective of his needs for home consumption and other requirements and it is the market effective quantity of sale.

3.2 Marketable Surplus in Sample Locations

Of the total production, 61-94 percent constitutes the marketable surplus in districts considered in the study and it varies from the lowest in Kurunegala to the highest in Ampara. The average marketable surplus of an individual farmer ranged from 3,760 kg in Kurunegala to 13,510 kg in Ampara districts in 2009/10 *Maha* season (Table 3.1).

However, average marketable surplus in Samanthurai area in Ampara district increased to 31,000 kg in the same season.

Table 3.1: Average Marketable Surplus of an Individual Farmer by Sample Location

In Kg

District	2009/10 *Maha*	2010 *Yala*
Ampara	13510	12980
Polonnaruwa	5790	5730
Anuradhapura	4800	2140
Hambantota	6470	5650
Kurunegala	3760	3860

Source: Field Survey, 2010

According to the survey, marketable surplus of an average farmer varied from the lowest 2,140 kg in Anuradhapura to the highest 12,980 kg in Ampara districts in 2010 *Yala* season. According to the data collected from the farmers in *Madirigiriya, Thamankaduwa, Dimbulagala* in Polonnaruwa district, their marketable surplus is around 80 percent of the total output in both seasons which is on average 5,700 kg (Table 3.2).

Table 3.2: Marketable Surplus as a Percentage of Total Production by Sample Location

District	2009/10 *Maha*	2010 *Yala*
Ampara	94	93
Polonnaruwa	79	80
Anuradhapura	75	70
Hambantota	77	66
Kurunegala	61	64

Source: Field Survey, 2010

In Hambantota district, 77 percent of the harvest was estimated as the marketable surplus that amounts to 6,470 kg in 2009/10 *Maha* season. *Yala* marketable surplus is little less than the *Maha* in Hambantota. However, marketable surplus in Anuradhapura district varies significantly between the seasons due to less paddy cultivation and more other field crops cultivation during *Yala* season. The marketable surplus in 2009/10 *Maha* season was 4,800 kg and it is only 2,142 kg in *Yala* season (Table 3.2).

3.3 Marketed Surplus and Storage by Farmers

Although marketable surplus explains the quantity of paddy to be sold to the market, its time of sale and the actual quantity of sale are determined by the behavior of the farmer subject to its production and marketing environment. Marketed surplus at a certain time period is therefore the market effective quantity that determines the price of paddy in the market. Of the total marketable surplus, disposals mainly take place as distress sales, sales due to lack of storage, on cash need basis and as price responsive sales. Usually distress sales that take place soon after harvesting was to settle the loans taken for production activities.

Table 3.3: Marketed Surplus[2] during the Season, *Maha* 2009/10

District	Of the Total Production (%)	Of the Marketable Surplus (%)
Ampara	92	98
Polonnaruwa	70	87
Anuradhapura	49	65
Hambantota	74	96
Kurunegala	58	94

Source: Field Survey, 2010

According to the sample information, almost the Ampara, Kurunegala and Hambantota marketable surplus of 2009/10 *Maha* production had been sold during the season and farmers had not stored their harvest to sell in the next season in those areas.

Table 3.4: Marketed Surplus Soon after Harvesting (within the first two weeks) as a Percentage of Total Production in Sample Locations

	2009/10 *Maha*	2010 *Yala*
Ampara	74	15
Polonnaruwa	30	18
Anuradhapura	22	24
Hambantota	51	40
Kurunegala	30	22

Source: Field Survey, 2010

In Ampara, 74 percent of *Maha* production[3] was sold within first two weeks after harvesting (Table 3.4 and Figure 3.1). Of these early disposals, 84 percent sample

[2] Marketed surplus refers to the actual amount sold during the period of *Maha* season from March to July. No carryover stocks from previous seasons were accounted.

[3] These estimates are based on findings of sample locations in relevant districts.

farmers had marketed more than 50 percent of their harvest during 2009/10 *Maha* season. Containing high moisture in paddy, lack of storage facilities and settling loans were the main reasons for early sales in large quantities in Ampara. There have been sales towards the end of the *Maha* season releasing *Maha* stocks before commencement of *Yala* anticipating a prosperous *Yala* season. Ampara farmers store much of their *Yala* harvest for later sales. Only 15 percent of the 2010 *Yala* production had been sold soon after harvesting (Table 3.4 and Table 3.5).

Table 3.5: Percentage of Farmers who Store Paddy during *Maha* and *Yala* in Sample Locations

District	Farmers' Response		Main Season Farmers Store Paddy
	Yes (%)	No (%)	
Ampara	88	12	*Yala*
Polonnaruwa	83	17	*Yala*
Anuradhapura	91	9	*Maha*
Hambantota	55	45	*Maha* and *Yala*
Kurunegala	60	40	*Maha* and *Yala*

Source: Field Survey, 2010

Table 3.6: Sample Farmers who Marketed more than 50 % of Their Harvest Soon after the Harvesting (within the first two weeks) during 2009/10 *Maha* season

District	Percentage
Ampara	84
Polonnaruwa	37
Anuradhapura	22
Hambantota	77
Kurunegala	54

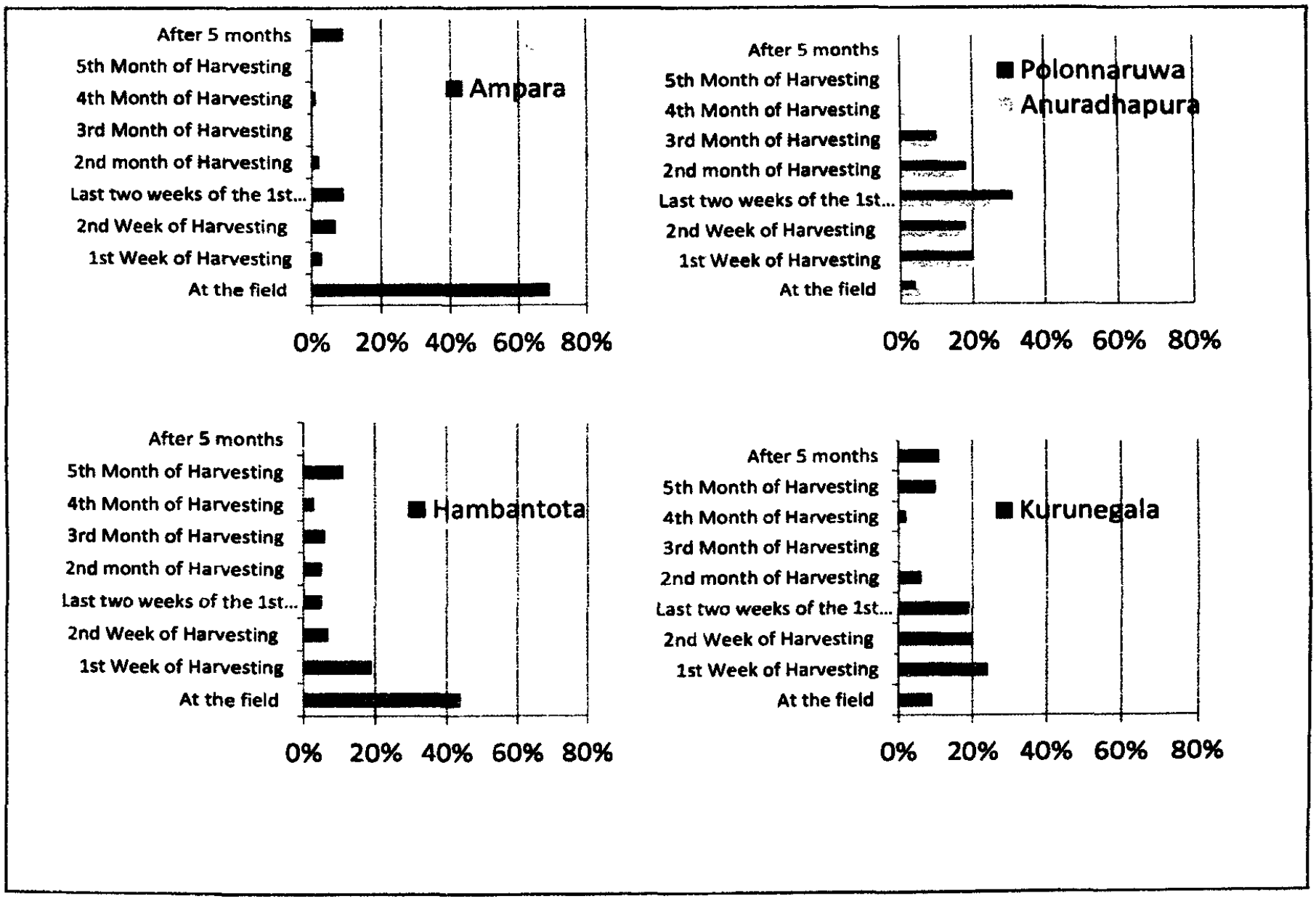
Source: Field Survey, 2010

Table 3.7: Reasons for Early Sales Based on Farmers' Response in Sample Locations

District	Reasons for Early Sales
Ampara	containing high moisture, poor storage facilities, settling loans, getting a better price
Polonnaruwa	settling loans
Anuradhapura	settling loans
Hambantota	settling loans, getting a better price
Kurunegala	getting a better price, settling loans

Source: Field Survey, 2010

In Polonnaruwa, 70 percent of the total production had been sold during the 2009/10 *Maha* season (Table 3.3). Of these sales during the season, 30 percent of the production had been sold soon after harvesting (Table 3.4). Some 37 percent of the farmers had sold their 50 percent of their *Maha* harvest within the first two weeks to settle the loan borrowed from banks, lenders and other financial sources. Farmers have to sell that amount without considering the market prices because they have to pay for workers, charges for threshers and other related expenses. Normally they sell that amount within the first week after the harvesting to village level collectors, outside collectors and millers in the village. Most of the farmers borrow money for paddy cultivation from rural banks and movement like Sarvodaya farm banks with 5-6 months repayment period. To settle these loans and other expenses farmers have to sell paddy irrespective of the market price. During *Yala* season only 18 percent of the *Yala* production was sold soon after harvesting and 83 percent of farmers store paddy speculating a favourable price towards the end of the year.



Source: Field Survey, 2010

Figure 3.1: Spread of Marketed Surplus Over 2009/10 *Maha* Season[4]

[4] Supplementary Table is given in Appendix 3.1

In Anuradhapura only 65 percent of the marketable surplus of *Maha* i.e. nearly 50 percent of the *Maha* production had been sold during the season and farmers store part of their *Maha* surplus for later sales during *Yala* season. In Anuradhapura, main cultivation during *Yala* season is either other field crops or kept fallow depending on the availability of water. Hence, they prefer to keep their *Maha* paddy surplus for future cash requirements and to get a higher price towards the end of the year. Of the total 2009/10 *Maha* production, 22 percent had been sold soon after harvesting and only 24 percent of farmers had sold more than half of the production just after harvesting. The disposals within first two weeks were 24 percent of the production during 2010 *Yala* (Table 3.4 and Table 3.5).

In Hambantota, farmers had sold 51 percent of their *Maha* production and 40 percent of their *Yala* production within the first two weeks after harvesting (Table 3.4). Of these early sales, 77 percent farmers had sold more than 50 percent of their harvest within the first two weeks after harvesting. Part of these disposals takes place as distress sales in Hambantota as farmers sold their harvest for settling loans. Also farmers had received a better price due to early sales. Yet according to farmer's response, 55 percent of Hambantota farmers would store their surplus during both *Maha* and *Yala* seasons for later sales for cash needs during the season. They take decisions on their sales during the season depending on the likelihood of getting a good harvest in the coming season and based on their day-to-day cash needs.

In Kurunegala too, early sales had taken place for cash repayments. Farmers had sold 30 percent of their *Maha* production and 22 percent of their *Yala* production within the first two weeks after harvesting mainly to settle loans (Table 3.4). In Nikaweratiya area farmers get credit facilities from collectors or they sometimes give weedicides and pesticides to farmers, to be paid in paddy. In Nikaweratiya area some farmers obtain credit facilities for cultivation from government or private banks. Almost 54 percent farmers in the survey area had sold more than half of their *Maha* production within the first two weeks. After selling the said amount of the harvest farmers decide about the selling of the remaining balance of the harvest. According to farmers' response, 60 percent of farmers would store their surplus during both *Maha* and *Yala* seasons for later sales for cash needs during the season. The storage time mainly depended on the amount of total harvest, current market prices and cash needs. But this year, farmers who stored paddy had to face the price deceleration in the market towards the end of *Maha*. Paddy price dropped to about Rs.18.00/kg closed to *Yala* harvesting and the government purchasing program helped increasing the open market price according to farmers.

According to the above analysis, determination of marketed surplus and storage decisions by paddy farmers depend on several factors. Marketing of paddy soon after harvesting is driven by large marketable surpluses, cash needs for repayment of loans,

high moisture content of paddy, lack of storage facilities, immediate cash needs and to some extent the better price prevailing at the beginning of the season. For continuous income for cash needs of farmers over the season, market speculations for better prices and the available storage capacity will be the factors for farmers to store.

It is observed that in the major surplus producing areas such as Ampara and Polonnaruwa, farmers dispose almost the total *Maha* harvest and they store *Yala* harvest anticipating a better price towards the end of the year until next *Maha*. Therefore, with the onset of *Maha*, large stocks of paddy surplus start to reach the market especially from Ampara at once where *Maha* harvesting begins first. This tends to have more inelastic supply with the onset of *Maha* that could lead to large price drops in the paddy market. Unlike Ampara district, marketed surplus is spread over a period of 3 months in Polonnaruwa and Anuradhpaura districts for price responsive sales to occur. Yet, 91 percent of Anuradhapura farmers stored some quantity of 2009/10 *Maha* paddy speculating a favourable price.

Distress sales are observed in Kurunegala and Hambantota districts primarily to pay credit where small farmers are dominant. In these districts, 50 -70 percent of farmers sell more than 50 percent of their harvest soon after harvesting (Table 3.6). Farmers in Hambantota, who cultivate less than 2 acres, tend to sell the entire harvest at once without storing. Other farmers cultivating more than 2 acres generally sell an adequate amount of the yield just after harvesting for loan settlement and then the rest is stored for a certain period.

During *Yala*, the lean production period farmers store fairly a good proportion of the harvest to be sold over the season until the beginning of next *Maha*. During 2010 *Yala* season, 83 percent of Polonnaruwa farmers stored paddy speculating a favourable price and it was 88 percent in Ampara (Table 3.5). Price responsive sale is the common way of disposing the marketable surplus during *Yala*.

3.4 Disposal Mechanism at the Farm/Village Level and the Main Buyers at the Farmer- Buyer Inter Phase

At the farm level, a number of market intermediaries are involved in purchasing paddy. They can be broadly categorized into assembly agents and rice millers. According to the farm survey, mainly assemblers and millers are operative at farm level in buying paddy. During the surveying year, PMB was operative at farm level in buying paddy and it was also considerable according to the farm survey.

The assembly agents are primary buyers of paddy and are often referred to as collectors. Some of them are paddy producers, input suppliers, and grocery traders. Many paddy assemblers are located in paddy producing areas and are called village level

collectors. According to the farm survey, village level collectors play a prominent role in Anuradhapura, and to some extent in Kurunegala and Polonnaruwa. They distribute the stocks of paddy to millers who are located in different parts of the country. The role of collectors becomes significant when the producing areas are located further from major milling areas. They collect paddy from farmers directly from farm gate. This is one of the reasons for farmers to sell paddy to collectors. Farmers need not pay transport cost, and can easily receive money and on some occasions they need not dry and clean the paddy again. But it is also common in sample locations that farmers carry their stocks to the village level collector, particularly in the districts of Anuradhapura and Kurunegala.

Collectors may also be from outside village and may be conducting the business temporarily during the season. They are traders conducting business in nearby towns who are operative in buying paddy during the season. Farmers transport their stocks to these traders or assembly agents outside their village. It is observed that these traders directly purchase paddy from farmers in Polonnaruwa. Only very few permanent collectors hold stocks due to lack of storage facilities and finances.

Table 3.8: Main Buyers of Marketed Surplus, 2009/10 *Maha* Season

To whom the Surplus was Sold	Percentage of Sample Farmers by District				
	Kuru'gala (%)	Ampara (%)	Hamb'tota (%)	Anu'pura (%)	Polonaruwa (%)
Village Level Collector	26	3	3	41	20
Divisional[5] miller	36	47	29	10	44
Paddy buyer in the near town	4	0		16	13
Outside Miller	19	46	64	30	7
Government	15	3	4	3	16

Source: Field Survey, 2010

It is commonly observed that a miller[6] is operative in buying paddy in Ampara, Hambantota, Kurunegala, and Polonnaruwa areas. The survey revealed that millers were the main buyers of paddy particularly in Ampara and Hambantota districts. The role of collector is insignificant in these districts (Table 3.8). In Ampara, millers directly purchase paddy at the farm gate and it is the case in Hambantota too. Except for very few occasions, millers from the area or from the surrounding area in the district purchase paddy at the farmgate in Hambantota. Therefore majority of the farmers in these areas do not transport their stocks to the buyer. Therefore, large quantities are disposed soon after harvesting in these areas. According to the survey it is observed that

[5] Divisional miller is the miller who is operative in the area.
[6] Both outside and divisional millers are accounted.

farmers in Anuradhapura and Kurunegala have to transport their stocks either to village level collector or to miller (Table 3.9)

As discussed in Chapter 2, the operation of PMB was significant with the excess paddy during 2009/10 *Maha* season and the respective decline of the paddy prices in the market. By establishing purchasing centers in main paddy producing areas, PMB purchased 2000 kg of quality paddy from each farmer nadu at Rs.28.00/kg and samba at Rs.30.00/kg at PMB stores. During the survey period, PMB activities were significantly activated in the Polonnaruwa and Kurunegala districts than in other paddy producing areas.

Table 3.9: Location of Disposal of Marketed Surplus, 2009/10 *Maha* Season

District	At the Field (%)	At Home (%)	Transport to the Traders or Firms Purchased (%)
Hambantota	34	60	7
Kurunegala	8	47	45
Anuradhapura	6	39	55
Polonnaruwa	18	58	24
Ampara	67	29	4

Source: Field Survey, 2010

3.5 Paddy Marketing Intermediaries and the Channels

This section describes different marketing intermediaries involved in the paddy marketing channel from farm-gate to miller through the information gathered from the interviews held with paddy marketing intermediaries and key personnel in the sampling districts.

3.5.1 Paddy Marketing Intermediaries and Marketing Channels in Ampara

As the highest paddy producing district and the district which the highest marketable surplus, Ampara district is of much importance in the Paddy/Rice sector in the country. It produces nearly 15 percent of the total production which is approximately 600,000 Metric tons annually. Several paddy marketing channels could be identified in the area depending on the mode by which they are connected to it.

Identified Major Paddy Marketing Channels in Ampara District

1. Farmer (Miller purchased at the farm gate) ⟹ Miller

2. Farmer ⟹ (Farmer bring to the mill) Miller.
3. Farmer ⟹ Village Collector ⟹ Millers
4 Farmer ⟹ Village Collector ⟹ broker ⟹ Millers
5 Farmer ⟹ Village Collector ⟹ Collectors from Outside ⟹ broker ⟹ Millers in Polonnaruwa
6 Farmer ⟹ Collector ⟹ broker ⟹ Millers
7 Farmer ⟹ PMB stores

Purchasing paddy stocks both from farmers and collectors is the major mode of purchasing paddy among rice millers in the region. It allows the millers to store required quantities of paddy stocks. Very few millers who are unable to contact/coordinate farmers purchase paddy stocks only from collectors. Mills which are located outside the region such as Kaduruwela and Polonnaruwa are the other main paddy marketing destinations. They are mainly large scale millers. Purchasing paddy only from farmers is the most popular method of paddy purchasing among large-scale millers. It is beneficial from the miller's point of view to purchase paddy directly from farmers without a broker. Marketing cost is free of broker charges and millers can assure of the quality of paddy they purchase if they directly purchase from farmers. Millers have already built a team of reliable permanent suppliers. Such millers purchase paddy through intermediate collectors only when there's severe scarcity of paddy stocks at the end of the season. That's only about 1-3 percent of total purchased amount.

Stock collectors, who are popular as small scale traders in the region collect, weigh, package and transport paddy stocks to the mills. Unlike earlier, they do not store paddy at present. Majority of stock collectors transport paddy to mills located outside the region such as Kaduruwela and Polonnaruwa bearing the cost of transport.

Intervention of intermediate brokers is newly popularized in Dehiattakandiya area. A broker intervene only when the miller purchase paddy from a collector. The broker provides the required coordination to the miller and collectors by regularly being aware of market conditions such as the places where the paddy stocks are available, the mills which demand paddy stocks, the standards/ variety of paddy/current status of supply and demand of paddy/rice in the market etc.

In the Eastern province, there were 13 PMB purchasing centers setup during the 2009/10 *Maha* season covering major producing areas. PMB purchases during 2009/10 *Maha* season accounted for about 6 percent of marketable surplus and it was 15% during *Yala* season.

3.5.2 Paddy Marketing Intermediaries and Marketing Channels in Polonnaruwa

According to the findings of the study in the Polonnaruwa district paddy market there are several major players (Buyers).

Farmers →
- Village level collectors (Small scale)
- (Large Scale)
- Village level millers
- District level large scale millers
- Paddy marketing board (including permitted buying Representatives, Farmer Organization & Cooperatives)

The extent and the role of the village level collectors in the district mainly depends on the situation of the areas such as the number of millers in the area, number of PMB stores in the area, distance from farmer gate to PMB stores and the moisture level of the paddy. According to these factors areas such as Madirigiriya, Dimbulagala, Galamuna which are far away from major milling areas, the role of collectors can be largely identified. Collectors have direct contact with large scale millers and they collect paddy from farmers directly at the farm gate and transport to millers with the margin of nearly Rs.100 per 50 kg of sack according to the field information.

In the Polonnaruwa district, in each paddy producing area, village based small and medium scale millers can be found and they tend to buy 5-10 percent of paddy harvest of the particular village.

District level large scale millers especially based in Hingurakgoda area namely Nipuna and Araliya buy large percentage of the paddy production of the year with their largest milling capacity and market potentials for rice in the rice market. They have specialized knowledge on the production, rice market, linked network with paddy collectors, brokers and other channels in the paddy rice market. On the other hand, normally those large scale millers tend to buy high quality paddy at higher prices than other millers. They are involved with paddy buying from farmers within their milling area and also from other areas through collectors and brokers.

During the study time period, the PMB operation was significant with the excess paddy and the respective decline of the paddy prices in the market. PMB activities significantly increased in the Polonnaruwa district than other paddy producing areas and nearly 10-14 PMB stores were established at the beginning. Around 2000 kg of paddy was bought from a single farmer from 2009/2010 *Maha* harvest and later the PMB had to buy another 1000 kg of the paddy to manage the paddy market prices due to the excess production.

Involvement of a broker in paddy marketing is commonly observed in Polonnaruwa. According to the brokers they typically receive nearly Rs.1000/= from millers for a load of paddy for the particular miller and on the other hand the collectors from their point also tend to pay Rs.500/-1000 for unloading at the mill. According to the farmers, the buyers from outside areas like Divulapitiya, Maradagahamula directly came to the farmgate to buy the paddy from farmers in the past. But for the past 3-5 years the arrival of outside collectors has been limited by the brokers and other prominent channel members in the district.

The Survey Identified that the Following Possible Paddy Marketing Channels in the Polonnaruwa District

1. Farmer .....> Miller at village level
2. Farmer .....> Village level collectors .....> collectors outside the area.....> District level Millers
3. Farmer .....> Village level collectors .....> District level Millers
4. Farmer .....> Village level collectors .....> broker .....> District level Millers
5. Farmer .....> Collectors from outside the area.....> District level Millers
6. **Farmer .....> Collectors from outside the area.....> broker .....> District level Millers**
7. Farmer .....> Village level collectors .....> Collectors Outside the area .....> broker.....>District level Millers
8. Farmer .....> Collectors from District level millers at farmgate
9. Farmer .....> PMB Stores
10. Farmer .....> PMB Representatives (Cooperatives & Others).....> PMB Stores
11. Farmer .....> Collectors .....> PMB Stores

The survey identified that the channel No 6 (collectors outside the area....> broker.....> district level millers) is the most prominent marketing channel in the Polonnaruwa district when we consider the general behavior of the paddy marketing system. That kind of marketing channel has been created mainly due to several key factors. This situation is predominantly observed in remote areas like Madirigiriya, Elahara, Palugasdamana, Dimbulagala where there is a lack of large scale millers. Farmers in such areas tend to sell their harvest mostly to village level collectors or collectors from outside the areas. These collections are as large as 75-85 percent in areas like Madirigiriya and Dimbulagala. The other reasons which promote farmers to sell paddy at collectors are they normally come to the farmer and buy paddy. No need to pay transportation cost, farmers receive cash promptly and no need to dry paddy again and clean again.

Farmers normally have to pay for workers who worked during harvesting and for other charges during the period of harvesting. Therefore, soon after harvesting they have to

sell nearly 1500 kg -2000 kg to settle these charges. With high moisture rates most farmers are unable to sell at PMB stores immediately after the harvesting. Then most of the farmers in remote areas tend to sell to the collectors. These collectors ultimately have to sell the collected paddy to district level large and medium level millers in Minneriya milling complex and in Kaduruwela milling areas. Brokers normally enter to the channel when collectors try to sell paddy to millers. Some collectors have direct contact with millers whereas others have to seek brokers' help. Brokers have direct contacts with collectors and millers then they interact with collectors and millers when unloading takes place. Brokers receive a commission of nearly Rs.1000 from the miller per lorry load of paddy and Rs.500-600 from collectors. The broker's charges vary according to the availability of paddy and during lean scarce harvesting seasons the charges are higher.

3.5.3 Paddy Marketing Intermediaries and Marketing Channels in Kurunegala

According to the results of survey in Nikaweratiya and Galgamuwa area, different marketing channels for paddy can be seen in operation as follows.

1. Farmer .....>Miller
2. Farmer .....> Collector .....>Miller
3. Farmer .....> PMB .....>Miller
4. Farmer....>Collector...>Broker.....>Miller

The most dominant marketing channel is direct purchasing by the miller. The first three marketing channels above are dominant in Nikaweratiya, whereas the first two marketing channels are prominent in Galgamuwa. In Galgamuwa the number of millers are lower compared to Nikaweratiya. Therefore, outside millers (from Nikaweratiya, Meegalewa, Anuradhapura) come to the area and purchase paddy from famers as well as collectors. Hence the price of a kg of paddy was lower in Galgamuwa than Nikaweratiya within same time period.

In Kurunegala district there are two types of collectors,

1. Permanent collectors
2. Temporarily collectors

When price of paddy is increasing some shop owners and businessmen collect paddy from farmers. But they do not purchase paddy regularly in every season. They do not have a store house to store paddy. Those are temporary collectors.

There are a few permanent paddy collectors in Nikaweratiya area. Some of them have storage capacity of more than 100,000 kg of paddy. They do not keep paddy stocks for more than 2 months. Within 2 months they sell their paddy stocks obtaining a minimum

of Rs.0.50 as margin of 1 kg of paddy. In certain instances they earn more than that. Especially during 2009/10 *Maha* season, collectors have obtained a margin of Rs.0.50 to Rs.4 per 1 kg of paddy. Some of these collectors have a strong relationship with certain farmers. Sometimes they provide credit facilities to farmers for their needs to build the trust. Further they provide weedicide and pesticide to farmers and they compensate with paddy.

The majority of collectors in Nikaweratiya area buy paddy from the surrounding area, and Anuradhapura during 2010 *Yala* season. Collectors sell their paddy stock at the stores and do not bring to mills. Some of them sell paddy to millers within the area and some of them sell to millers in Maradagahamula and Embilipitiya.

PMB purchases were also at a considerable level during the study period. Particularly towards the end of the 2009/10 *Maha* season, paddy price dropped sharply and farmers who stored paddy had to face an unexpected situation. Due to that reason the government purchased 1000 kg from each farmer, considering it as intermediate season. With the purchasing of *Yala* harvest by PMB, price of paddy increased considerably. In Nikaweratiya there was only one paddy purchasing center of PMB, , located in Millagoda. Farmer who lived nearby only sold their paddy to PMB. Many farmers in the other areas had to sell their paddy stocks to small scale millers and collectors. Many farmers do not have any contract with millers or collectors to sell their paddy. But many farmers sell paddy just after harvesting to meet labour and machine cost related to harvesting and other expenditure. Soon after harvesting they cannot sell their paddy to PMB, due to high moisture content. Usually, PMB purchases begin only 3-4 weeks after harvesting. By this time much of the distress sales have taken place.

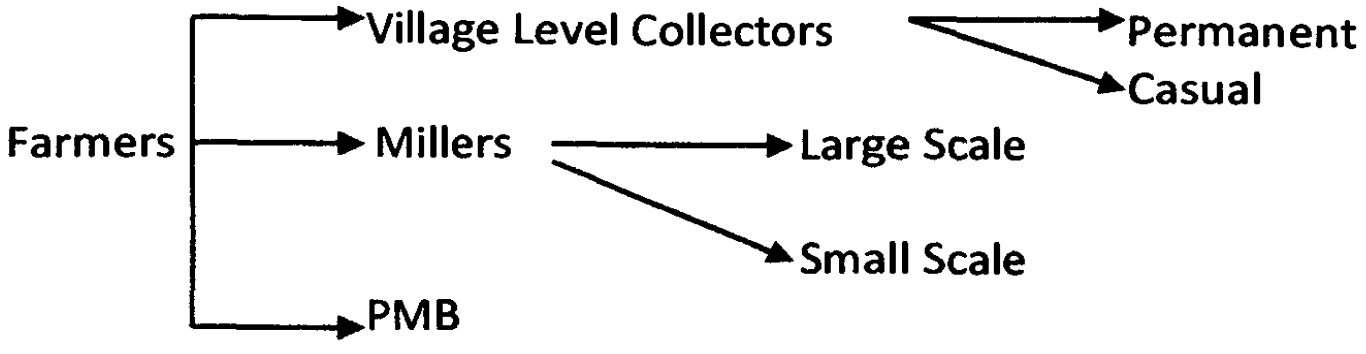
In Nikaweratiya of Kurunegala district, brokers do not play a considerable role and only one broker was practicing in the town. Due to good infrastructure facilities and usage of the telephone, collectors and millers contact directly. For a 5000 kg of rice load broker charge is around Rs.1000/=.

3.5.4 Paddy Marketing Intermediaries and Marketing Channels in Anuradhapura

According to the findings of the study, several major players can be found in the Anuradhapura paddy market (buyers).

The village level collector plays a major role in paddy marketing in the Anuradhapura district. Based on the availability of mills in the area, the number of PMB stores available, distance between farm-gate and the PMB, the level of moisture in paddy etc, the role of the collectors vary. Particularly in areas such as Galenbindunuwewa, Rajanganaya where mills are not abundant, collectors play a major role. Village level collectors also provide loans to farmers for their consumption and farming needs.

Therefore, each farmer tends to sell their harvest to collectors. Collectors in turn sell to millers whom they have direct contacts.



Both large scale and small scale millers are found in the district. Mostly small scale millers are operative at village level. Sometime village level small scale millers also act as a collector. Farmers usually bring their paddy to the mill. Large scale millers are found in Nachchaduwa, Kekirawa, Ganewalpula, Kahatagasdigiliya and Anuradhapura town area. The milling capacity of these mills ranges from 5,000 kg to 60,000 kg per day. The millers store paddy during *Maha* season expecting an increase in rice prices towards the end of *Maha* season. Their storage capacity ranges from 3000 mt to 5000 mt.

Brokers also play a major role in paddy marketing channel. Broker is the main intermediary of the operation. His role is searching for stocks of paddy and buying it from farmers/collectors. Sometime millers have brokers as the agents. For that, millers pay some commission to the broker. According to the farmers interviewed, broker charge is Rs.10.00 per sack of paddy.

PMB activities were also initiated during 2009/2010 *Maha* season by establishing 22 PMB stores throughout the district and by purchasing 1000 kg of paddy per farmers. However this operation ceased after about month of its operation. Then PMB recommenced activities after a sharp decline of prices towards the end of the season. PMB continued activities during 2010 *Yala* season too. However, the PMB intervention was not significant in the district.

Accordingly following broad marketing channels could be identified in the area as follows.

1. Farmer .....> Miller
2. Farmer .....> Collector .....> Miller
3. Farmer .....> PMB .....> Miller
4. Farmer.....> collector.....>broker .....>Miller
5. Farmer.....>farmer.....>broker .....>Miller
6. Farmer .....> Farmers company .....> Millers

Of the above channels, the prominent market channels of paddy in the district is

Farmer .....> Village level collector.....> broker .....> Miller

According to the millers, they obtain paddy at the farm gate as well from farmers at the mill.

3.5.5 Paddy Marketing Intermediaries and Marketing Channels in Hambantota

There are different marketing channels of paddy operating in Hambantota district. They are as follows:-

1. Farmer....>Miller....Wholesaler...>Retailer.....>Consumer
2. Farmer....>Miller....>Retailer....>Consumer
3. Farmer.....>Miller.....>Wholesaler.....>Consumer
4. Farmer....>Miller.....>Consumer
5. Farmer....>Broker.....>Miller.....>Wholesaler.....>Retailer.....>Consumer
6. Farmer.....>Broker.....>Miller.....>Retailer.....>Consumer
7. Farmer.....>Broker.....>Miller.....>Wholesaler.....>Consumer
8. Farmer....>PMB....Miller.....>Cooperatives.....>Consumer

Millers, brokers, PMB, and cooperatives are the main middlemen involved in paddy marketing in the Hambantota district. The most vital role is played by the millers, because a large number of mills are located in the area. Collectors, who play a dominant role in other paddy surplus areas, cannot be seen in Hambantota and first marketing channel is very distinct compared to other marketing channels.

Paddy is the sole income source of most farmers who cultivate 1-3 acres. Therefore, they take loans for the cultivation purposes. As a result, farmers need to sell paddy immediately after harvesting to settle the loans.

Farmers have no bargaining power compared to millers owing to their small size of holdings. Consequently, farmers have to sell paddy at any price that millers are willing to purchase but would try to sell their produce to those who offer a higher price. Farmers, who cultivate less than 2 acres of land, tend to sell the entire harvest at once without storing. Other farmers who cultivate more than 2 acres generally sell an adequate amount of the harvest just after harvesting for loan settlement and then the rest is stored for a certain period in order to get a favourable price.

It was revealed many farmers are reluctant to market paddy to the PMB, because they have to encounter various inconveniences such as drying of paddy up to 14 percent moisture level, transporting paddy to the store of the PMB multiple times, corruption of the officers involved in PMB operation.

Farmers commonly use combined harvesters for harvesting and therefore paddy contains high content of moisture. Farmers prefer to sell paddy to the millers compared to PMB, because millers directly buy moist paddy. According to the farmer's point of view, selling paddy to the millers even at a relatively low price is advantageous for them rather than selling to PMB.

Some farmers obtain loans from the millers without any interest or at a low interest. Those farmers have to market their harvest to those respective millers at a prevailing market price immediately after harvesting.

3.6 Concluding Remarks

There is about 4-10 Mt of marketable surplus at farm-gate in *Maha* season and about 2-6 Mt in *Yala* season in major producing areas. This figure increases to 33 Mt in the areas such as Samanthurai in Amapara district. This surplus is disposed mainly as distress sales, sales due to lack of storage and high moisture content of paddy and as price responsive sales. More than 75 percent of Ampara and Hambantota farmers had disposed more than 50 percent of their *Maha* surplus soon after harvesting. Ampara and Polonnaruwa farmers had disposed almost the total *Maha* harvest during the season and they stored *Yala* harvest anticipating a better price towards the end of the year until next *Maha*. More than 90 percent of Anuradhapura farmers had stored some amount of 2009/10 *Maha* paddy speculating a favourable price. Determination of marketed surplus and storage decisions by paddy farmers depends on several factors. Distress sales are observed in Kurunegala and Hambantota districts primarily to pay credit where small farmers are dominant. In these districts, 50–70 percent of farmers sell more than 50 percent of their harvest soon after harvesting. Farmers in Hambantota who cultivate less than 2 acres of land, tend to sell the entire harvest at once without storing. Other farmers cultivating more than 2 acres, generally sell an adequate amount of the yield just after harvesting for loan settlement and then the rest is stored for a certain period. During *Yala*, the lean production period, farmers store fairly a good proportion of the harvest to be sold over the season until the beginning of next *Maha*. During 2010 *Yala* season, 83 percent of Polonnaruwa farmers stored paddy speculating a favourable price and it was 88 percent in Ampara. Price responsive sale is the common way of disposing the marketable surplus during *Yala*.

Marketing of paddy soon after harvesting is driven by large marketable surpluses, cash needs for repayment of loans, high moisture content of paddy, lack of storage facilities, immediate cash needs and to some extent better price prevail at the beginning of the season. For continuous cash needs of farmers over the year, market speculations for better prices and the available storage capacity will be the factors for farmers to store. In particular due to the high content of moisture in Ampara paddy, farmers dispose their

harvest early as possible. Marketed surplus is spread over a period of 3 months in Polonnaruwa and Anuradhpaura districts and price responsive sales take place.

Farmers sell their surplus to village level collectors or to millers either at farm gate/house or by bringing their stocks to the mills. It is commonly observed that millers are operative in buying paddy in Hambantota, Kurunegala, Ampara and Polonnaruwa districts while village level collectors play a prominent role in Anuradhapura and also to some extent in Polonnaruwa. Frequently large millers buy paddy at farm-gate directly sending their Lorries to the farm or through village level collector. When a village level collector is operative in buying paddy, stocks are sold to the miller through a broker and he acts as an intermediary in the marketing channel. When small to medium scale millers are operative in buying paddy, often farmers carry their stocks to the mill as in the case of Kurunegala and Anuradhapura farmers.

With the onset of *Maha*, large stocks of paddy surplus start to reach the market especially from Ampara at once where *Maha* harvesting begins first. This tends to create more inelastic supply with the onset of *Maha* in Ampara that could lead to large price drops in the Ampara area depending on the intensity of buying operation in the area. Prices can go extremely down if outside millers or government purchasing is not operative. Based on the size and the disposal behavior of the marketable surplus, more inelastic supply of paddy is observed in Ampara during *Maha* season. *Yala* season is characterized by price responsive disposal of marketable surplus or less inelastic supply in major producing areas.

CHAPTER FOUR

Behaviour of Millers in Rice Milling Industry

This chapter attempts to elicit the miller's behaviour that would influence several marketing functions from buying paddy to selling out of rice in the marketing channel. Major functions such as buying, storing, processing and wholesaling and retailing of rice are discussed in this chapter in regional paddy markets studied. Information on size of the miller and their concentration within region is also studied.

4.1 Rice Milling Industry in General

Rice milling industry is the second largest agro based industry in the country. According to PMB Survey in 1986, there are over 7000 mills in the country (Rafeek et al., 2002). Rice milling sector is mainly categorized by two main forms of rice mills namely custom and commercial rice mills. The custom mills are those at the village level, which milled small quantities of rice on a fee basis for household consumption. Others are large mills conducting commercial scale milling. The total milling capacity in the country was estimated to be approximately 2700 metric tons per hour, of which 60 percent is within the purview of custom mills and the rest in commercial mills. Rice milling sector is mainly controlled by the private sector. A survey conducted by the Institute of Post-Harvest Technology (IPHT) in 2002 revealed that all the custom mills and 95 per cent of the commercial mills are owned by the private sector. The rest of the commercial mills belong to Cooperatives.

However there is no unique classification for rice mills according to the scale of operation. According the classification based on milling capacity per day by IPHT, more than 8 mt per day are considered large scale and in between 5-8 mt per day are medium scale and less than 5 mt per day are small scale. Hathurusinghe (2007) found out, 11 percent of the mills were more than 8 mt milling capacity of paddy per day and 7 percent were 5-8 mt per day.

The custom rice mills are of the traditional huller type, where the paddy is milled using a single steel huller. The commercial rice mills can be categorized into three main types depending on the machinery used for milling, namely traditional, semi modern and modern types. In the traditional type of mill, both de-husking and polishing operations are done through one or more steel hullers whereas in the semi-modern type de-husking of paddy is done using a rubber roll sheller and polishing of rice is performed with one or more steel hullers. The modern type of mill has separate specialized machines for each milling step such as pre-cleaners, destoners, rubber roll shellers, rice separators, rice polishers and graders. Among the commercial rice mills, 25 percent are

of the traditional type, 35 percent are of the semi-modern type and 40 percent are of the modern type (Palipane, 2002).

4.2 Structure and Functions of Millers in Kurunegala District

4.2.1 Structure of the Milling Industry in Kurunegala District

Paddy milling industry is a largest agro-based industry in Kurunegala district as well as in Nikaweratiya region. There are two main forms of paddy mills. Those are custom mills and commercial rice mills. Custom mills are the small mills which are characterized by the use of conventional technology and need for rural home consumption purposes. The milling cost is based on machine types or technology they used. Generally it is around Rs.4-5 per kg of rice.

Commercial mills purchase and store paddy and produce rice for sale to the open market. They play a major role in the marketing channels of paddy and rice and obtain a considerable margin while acting as an intermediary.

The commercial mills can be classified depending on the machinery used and daily milling capacity. In Kurunegala district there are many small scale mills and they scatter all over the district. There are about 108 mills in the district according to official records (AGA office Kurunegala) and a small number of larger scale mills operated in the district compared to other districts. In Nikaweratiya divisional secretariat division there are two mills which have more than 15,000kg/day milling capacity. Moreover they use new machine types like elevator and colour separator. There are 3 mills which exceed 8000kg/day milling capacity in the area whereas in others, the milling capacity is lower than 8000 kg/day.

Of the two sampling areas, in Galgamuwa the number of millers is low compared to Nikaweratiya. Therefore outside millers from Nikaweratiya, Meegalewa, Anuradhapura purchase paddy from famers as well as from collectors. According to survey, nearly 90% of millers only do milling as their occupation, but only 7 percent of millers have more than 10 years' experience in the milling industry.

4.2.2 Behaviour of Millers in Kurunegala District

In the milling industry, there are four main functions such as buying paddy, storing paddy, processing and selling rice.

Buying paddy

Most of the millers purchase paddy at the mill while some quantities are purchased from collectors and from farmers at the farm gate. According to the survey, 80 percent of purchased paddy by millers was brought to the mill by farmer or collectors. Many millers of the area purchase paddy from farmers or collectors within the area. Some of them go to outside areas like Horowpathana, Thambuththegama and Rajanganaya areas for purchasing. Millers have to purchase paddy with high moisture content and inert materials. This has happened due to use of combine harvester for harvesting. Presence of relative bargaining power is illustrative that gap between price of millers and PMB is lower compared to other districts. Further according to prevailed price during 2009/10 *Maha* season, the price gap between collectors and miller was not more than Rs.1/kg of paddy.

Millers commonly buy paddy from Nikawaratiya area in addition to purchases taken place from Meegalewa, Thambuththegama, Rajanganaya, Kahatagasdigiliya, Horrowpathana, Anuradhapura and Galgamuwa areas.

Storing Paddy

According to findings, 55 percent of millers store purchased paddy. All the millers who store paddy heap them on the floor in sacks. Millers experience loss during storage with the time due to pest attacks like weevils, moths and ants in addition to loss of moisture.

Processing

According to the milling survey estimations, the average cost of processing 50 kg of nadu rice and samba rice is Rs.146 and 150 respectively. The estimated milling recovery rates of good quality paddy according to the survey are, 65 percent for white short paddy and 68 percent for white long paddy (Table 4.1). Milling yields 3 percent broken samba rice and 2.6 percent broken nadu rice. In the case of rice bran, it yields around 4.58 kg and 4.1 kg per 100 kg of white short paddy and long paddy respectively. Conversion of paddy to rice depends on several factors such as size of the grain, percentage of filled grains and machine types used for processing.

In Nikaweratiya region, the number of raw rice producing mills is low and raw rice production is around 5 percent among them. No miller follows any regulation or standard imposed by SLSI regarding quality of rice in milling operation.

Table 4.1: Average Cost of Processing of 50 kg of Rice and Turnover of Rice per 100 kg of Paddy by Kurunegala Miller

Type of Rice	Average Cost of Processing of 50 Kg of Rice (Rs)	Average Cost of Processing per Kg of Rice (Rs/Kg)[7]	Rice Turnover per 100 kg of Paddy in kg
Nadu	146.46	2.90 Rs/kg	67.8
Samba	150.82	3.00 Rs/Kg	65

Source: Field Survey, 2010

Selling Rice

In selling rice, the predominant method of selling rice was selling at the mill at wholesale price. However, some of them transport rice to buyers and sell at wholesale price (Table 4.2).

Table 4.2: Method of Selling Rice by Kurunegala Millers

Method	Millers by Percentage
Buyers visit the mill & wholesaling	44
Bringing to buyers & wholesaling	27
Selling at retail outlets	10
Other	19

Source: Field Survey, 2010

The most prominent marketing channel of the rice market is "Miller----->Wholesaler----> Retailer -------> Consumer". Also, "Miller------> Retailer--------> Consumer" channel is common. The role of broker is not distinct in rice market in Kurunegala district and "Miller----->Broker------>Wholesaler-------->Retailer-------->Consumer" marketing channel can rarely be seen. The broker charge is around Rs.1000 for 5000kg of paddy.

With reference to selling points of rice, Mawanella, Kegalle, Kurunegala, Awissawella, Ehaliyagoda, Polgahawela, Kandy and Chilaw are destination places of the above marketing channels. Average quantity of rice sold per week was 12.7 mt in the sample of millers surveyed.

Millers in Nikawereatiya area sell their rice mainly to Kegalle, Mawanella, Ratnapura, Ehaliyagoda and Kurunegala rice markets. Many of them sell at the mill and some of

[7] Based on millers estimation on the variable cost of milling

them bring their rice to wholesaler. The selling price of good quality samba ranged between 51.00 -52.00 Rs/kg and 38.00- 42.00 Rs/kg for good quality nadu.

Incapability to compete with larger millers and difficult to sell at a price that can cover the milling cost is the major problem that small scale millers have to encounter in order to be in the business. Difficulty to access to credit facilities is another problem.

In the previous *Maha* season some millers had purchased paddy from farmers and collectors at a higher price than offered by the PMB. Also during this season some millers had stored a large stock of paddy. However, within the month of June and July due to price reduction of rice they had to mill the stock and sell rice at a low price. Therefore some millers had stopped milling operation. But some small scale millers who do not maintain a larger stock of paddy had not stopped their operation as they buy paddy on daily basis. But on rainy days they have to stop their operation since having no dryers. According to the survey, there is no mill which is functional throughout the year. The operating time of the year of small millers varies according to market behavior especially the price of rice.

4.3 Structure and Functions of Millers in Anuradhapura District

4.3.1 Structure of the Milling Industry in Anuradhapura District

In the Anuradhapura district, both large scale and small scale millers operate where small scale millers operate mainly at village level. Occasionally village level small scale miller functions as a collector as well. They mill paddy and sell in the mill itself which is bought to the mill by farmers. Large scale millers spread throughout the district have good knowledge about the market demand and supply situation and the behavior of market participants. These large scale millers also have developed a network among farmers, paddy collectors and brokers. Hence they have been able to dominate the milling operation.

In Anuradhapura district mills are concentrated in Nachchaduwa, Kekirawa, Ganewalpula, Kahatagasdigiliya and Anuradhapura town area. The milling capacity of these mills ranges between 5000/kg to 60,000/kg per day.

4.3.2 Behaviour of Millers in Anuradhapura District

According to millers usually they purchase paddy from farmers who bring their paddy to the mill and from farmers at the farm gate. It is common among large millers to purchase paddy at the farm gate and occasionally they purchase paddy from collectors as well (Table 4.3). The market prices of the millers in buying paddy during *Maha* season varied between Rs.26.00-30.00/kg for nadu and Rs.27.00-33.00/kg for samba.

Table 4.3: Method of Buying Paddy by Anuradhapura Millers

Method of Buying	Percentage of Millers Surveyed
Farmers at farm gate	37.5
Farmers at mill	50.0
Collectors	12.5

Source: Field Survey, 2010

Millers store paddy during the *Maha* season anticipating a price increase towards the end of the season. Some 80 % of sample millers had stored paddy during the 2009/10 *Maha* season. Packing in sacks and heaping on the floor is the common method of storing paddy. Pest and rat damages are common during storing of paddy. Most of the mills lack dryers and those used dryers for milling have the milling capacity of more than 8 mt per day and produce parboiled rice. Their storage capacity ranges between 3000 mt – 5000 mt.

Table 4.4: Average Cost of Processing of 50 kg of Rice and Turnover of Rice per 100 kg of Paddy by Anuradhapura Miller[8]

Type of Rice	Average Cost of Processing of 50 Kg of Rice (Rs)	Average Cost of Processing per Kg of Rice[9] (Rs/Kg)	Rice Turnover per 100 kg of Paddy in kg
Nadu	175.13	3.50	62-66
Samba	169.72	3.39	65-70

Source: Field Survey, 2010

Generally milling process yields 78-80/kg of parboiled rice from 100 kg of paddy under fully efficient use of machinery. But according to millers under current situation they can obtain only 62-66/kg of nadu rice from 100/kg of paddy and 65-70 kg of samba rice from 100 kg of paddy (Table 4.4). According to the millers, average cost of processing of 50 kg of nadu rice and samba rice was Rs.175 and 170 respectively. Though main product of paddy milling includes rice, the industry has by-products such as husk, bran and broken rice. Traditional milling system did not possess operations such as separation of broken rice, husk and bran. Millers can sell their rice bran Rs.28.00/kg and husk at Rs.10.00-12.00/kg.

Millers distribute their rice to retailer or wholesaler and they sell to customers. Transporting paddy stocks to wholesalers is the common method of selling rice (Table

[8] The millers surveyed are medium size millers based on their milling capacity
[9] Based on miller's estimation on variable costs of milling

4.5). The major market being Colombo, most of the millers try to sell their products in the Colombo market. The selling price of samba was Rs.50.00-55.00/kg price level and nadu was Rs.42.00- 46.00/kg.

Table 4.5: Method of Selling Rice by Anuradhapura Millers

Method	Millers by Percentage
Buyers come to mill and wholesaling	23
Bringing to buyers and wholesaling	69
Selling at retail outlets	8
other	13

Source: Field Survey, 2010

According to the millers, the cost of processing 1 kg of rice in the district varied between Rs.3.00-4.00. The millers sell their rice in market. Sometime effect the commission market and also they face difficulties of rice sell Anuradhaprura district. Most of the mills used new technology machines like cleaners, steel hullers, rubber roll shellers, separators, polishers and colour separators.

4.4 Structure and Functions of Millers in Hambantota District

4.4.1 Structure of the Milling Industry in Hambantota District

A large number of commercial mills are centralized in Tissamaharama and Ambalantota areas in the Hambantota district while medium scale rice mills are distributed evenly in all major producing areas in Hambanthota. There are 115 mills operated as 65 and 50 respectively in Tissamaharama and Ambalantota areas. Almost all the mills process only raw rice. Mills in Hambantota can mainly be categorized as small and medium scale depending on the scale of operation.

4.4.2 Behaviour of Millers in Hambantota District

Main operations of millers are buying paddy, storing them, processing as per the requirement and finally selling rice.

In buying paddy, majority of the medium scale millers buy paddy at farm gate using their own transport vehicles such as Lorries and tractors while some millers buy paddy from farmers when they bring to the mill (Table 4.6). There are some millers who buy paddy both at the mill and at farm gate. Millers who go to farm gate purchase paddy from their own areas or from distant areas. It was observed that the collector was absent in

marketing channel in Hambantota which indicates there was no middleman between the farmer and miller.

Table 4.6: Method of Buying Paddy by Hambantota Millers

Method of Buying	Percentage of Millers Surveyed
At farm gate	40
At mill	60

Source: Field Survey, 2010

There are a small number of mills in the Hambantota DS division area of the Hambantota district and therefore outside millers have got used to come to that area for purchasing of paddy. In this instance, brokers play a role in dealing with farmers and millers, because outside millers are new to that area. Although brokers facilitate the millers in buying paddy, it has become one of the reasons to decline in the purchase price to a certain extent compared to other areas in Hambantota district.

Price is determined by the miller's organization. However, millers state that purchasing price that is determined by the organization is not functional. Millers would prefer to buy paddy in large stocks during the harvesting season to fill their stores. Therefore, millers increase the set price by 1 or 2 rupees per kg due to the competition from others for buying paddy.

Millers purchase moist paddy from farmers at a low price and they are made to dry well by labourers before storing. Storing is done by packing paddy in sacks and heaping on the floor. According to the millers, average cost of processing of 50 kg of raw rice equals to Rs.114.00 (Rs.2.28 per Kg).

Table 4.7: Method of Selling Rice by Hambantota Millers

	Millers by Percentage
Bringing to buyers and wholesaling	86
Buyers come to mill and wholesaling	14

Source: Field Survey, 2010

In selling rice, most of the medium scale millers deliver rice to the wholesalers and retailers and also wholesale at the mill to the regional and outside traders who come to the mill. Millers also sell rice to the direct consumers who come to the mill.

4.5 Structure and Functions of Millers in Polonnaruwa District

4.5.1 Structure of the Milling Industry in Polonnaruwa District

Milling industry of Polonnaruwa district is considered significant when attention is paid to paddy and rice market in Sri Lanka due to the operation of large number of mills including large, medium and small scale mills. Considering the type of paddy processing mills in the district, parboiled and also raw rice processing are done and machinery with new technology are widely used by these millers to improve the quality of the rice they produced.

Table 4.8: Mills Distribution in Polonnaruwa by Milling Capacity

Classification Based on Scale of Operation	Milling Capacity per Day	Number
Small Scale	Around 5,000 Kg per day	12
Medium Scale	5,000 - 8,000 Kg per day	37
Large Scale	8,000 - 10,000 Kg per day	20
	10,000- 25,000 Kg per day	85
	25,000 - 50,000 Kg per day	35
	50,000 - 75,000 Kg per day	6
	75,000 - 100,000 Kg per day	2
	100,000 - 300,000 Kg per day	2
	> 300,000 kg per day	1

Source: Divisional Secretariat Office, Polonnaruwa[10]

According to the classification of mills based on the literature[11] large scale mills are predominately found in the district (Table 4.8). The largest milling capacity recorded based on unofficial statistics has a capacity of 400 mt per day. Majority of mills have the milling capacity between 10,000-25,000 kg per day.

The mills are located in major paddy producing areas in the district such as Minneriya, Girithale, Madirigiriya, Hingurakgoda and Kaduruwela. The large scale millers are mostly located at Kaduruwela Muslim Colony and at the Minneriya Milling Complex (Katukeliyawa). These two areas are the major paddy milling areas in the Polonnaruwa district. Large scale millers have specialized knowledge on rice production, rice market, linked network with paddy collectors, brokers and other channels in the paddy rice market.

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[10] Unofficial data
[11] Palipane(2002)

Table 4.9: Distribution of Polonnaruwa Mills by Quantity of Milling Capacity per Day by DS Division

DS Division	In Number	Cumulative Milling per Day	Of the total Milling per Day (%)
Thamankaduwa	105	2206360	48.6
Hingurakgoda	50	1495500	32.9
Lankapura	12	383400	8.4
Madirigiriya	15	169500	3.7
Dimbulagala	13	200000	4.4
Elahera	4	67500	1.5
Welikanda	1	20000	0.4

Source: Divisional Secretariat Office, Polonnaruwa[12]

Small and medium scale mills are also located in all paddy farming areas in the district including Madirigiriya, Galgamuwa, Elahara, Dimbulagala, Jayanthipura, Bandiwewa, Unagalawehera, Jayawickrama Junction. They depend mainly on the paddy harvest collected from the nearest paddy producing areas where they operate. Mostly farmers of these areas sell their harvest to these mills and millers buy the balance quantity of paddy for their full employment of the mill, through the collectors from different areas in the district. According to field information gathered there are about 200 to 250 medium to large scale millers spread in the area.

4.5.2 Behaviour of Millers in Polonnaruwa District

The large scale and medium scale mills located at major paddy milling areas in Minneriya and Kaduruwela buy paddy from collectors who transport paddy from all areas of the district. In addition to buying paddy from the district these large scale millers buy paddy from other districts including Kurunegala, Ampara, Anuradhapura as well. In the case of paddy being purchased from distant areas, millers tend to get the assistance of a broker. Through broker, millers can easily buy quality paddy at lower prices. They have built close links with brokers and collectors in facilitating to buy the required quantity at the required time.

[12] Unofficial data

Table 4.10: Method of Buying Paddy by Polonnaruwa Millers

Method of Buying	Percentage of Millers Surveyed
From Farmers at farm gate	17
From Farmers at mill	33
From Collectors	50

Source: Field Survey, 2010

According to the field information, large scale millers especially based in Hingurakgoda area namely *Nipuna* and *Araliya* buy the large proportion of the paddy owing to their large milling capacity and storage capacity and the market potentials for their rice in the market. Large scale millers like *Nipuna* and *Rathna* mills buy paddy at farm gate in seasons when the paddy harvest is lower. According to the collectors, the *Nipuna* Rice Mills normally buy high quality rice (with 14.5 percent moisture) at a higher price than other millers.

However it is important to note that those large scale millers tend to buy high quality paddy at higher prices than other millers as noted earlier.

Small and medium scale mills are involved with paddy buying from farmers within their milling area and from other areas through collectors and brokers.

There are 5-6 large scale millers functioning in Polonnaruwa district and buy a high percentage of paddy out of the total harvest in the district. They are namely Nipuna Rice, Araliya Rice, Hiru Rice mills, Tharaka rice mills and Sanjeewa Rice mills. According to the interviewed collectors, these large millers are in a position to buy large quantities of paddy that can influence the paddy market with their larger milling capacity, storage capacity and the market share they have acquired in the rice marker in Sri Lanka.

According to the brokers they typically receive nearly Rs.1000/= from millers when they deliver a load of paddy to a miller. On the other hand the collectors from their point also tend to give Rs.500-1000 for unloading at the mill. This profit margin also directly or indirectly adds to the cost of production of rice at millers and due to this margin collectors buy paddy at a price which to cover broker charges as well.

In processing paddy, commercial millers in the district use new machinery to enhance the quality of the rice they produce. Most of the millers use rubber rollers, polishers, destoners, hullers and cleaners and the graders, drudgers colour separators are used by the large scale millers with their higher milling capacity. On average, the cost of processing 50 kg of rice amounts to Rs.213.00 (Rs.4.26 per kg) and Rs.230.00 (Rs.4.60 per kg) for nadu and samba rice respectively.

Table 4.11: Method of Selling Rice by Polonnaruwa Millers

	Polonnaruwa (%)
Buyers come to mill and wholesaling	27
Bringing to buyers and wholesaling	53
Selling at retail outlets	7
other	13

Source: Field Survey, 2010

Commercial millers practice wholesale business in the rice market. Most of the millers interviewed in the survey sell their rice to Colombo, Avissawella, Galle, Gampaha, Deraniyagala, Kegalle, Veyangoda, Nittambuwa, Rathnapura, Alawwa, Kurunegala and large scale millers like Nipuna, Araliya, New Rathna mills supply their rice to all the districts in Sri Lanka. Most of the medium scale millers have built a rice market to sell their products at wholesale market and in addition to that they sell at retail for people in the particular area. Small scale millers operate within the district.

4.6 Structure and Behaviour of Millers in Ampara District

4.6.1 Structure of the Milling Industry in Ampara District

Three rice milling areas can be identified in the Ampara district clearly. Akkeripattu, Kalmunei, Nindavur and Samanthurei can be identified as the first one where several small scale millers are distributed. Ampara and its suburbs and the Mahaweli areas of the Dehiattakandiya are the other two milling areas. Both Ampara and suburbs and Dehiattakandiya area have four large scale mills in each of them. Miller's information reveals that nearly 150 mills operate in the district while more than 70 percent of them are concentrated in the first area mentioned above.

The majority of the mills concentrated in Akkeripattu, Kalmunei Zone mostly produce raw rice: raw red and raw white.

When the availability of modern machinery is concerned, nearly ten mills possess mechanical dryers, and less than 10 possess color sorting machines. In addition, modern polishing and grading machines are also rare.

4.6.2 Behaviour of Millers in Ampara District

The common paddy purchasing method of millers is by directly buying from farmers. Every mill has a considerable number of dedicated farmers who provide paddy. There is a farmer base of nearly 200 farmers to each large scale miller. However, during the off

season the millers tend to purchase paddy through collectors and brokers. But the functions of the brokers are relatively lower than that of Polonnaruwa.

Few large millers operating in Ampara and Dehiattakandiya areas sell rice to Colombo markets and supermarkets such as Cargills and Keells. The major selling focus of the millers in Akkeripattu and Kalmunei is areas in the estate sector and southern consumers.

The major problem encountered by the millers in Ampara is receiving low quality paddy, especially with high moisture content. According to the millers the paddy received from colonies such as Uhana, Bakmetiyawa, Higurana, Weeragoda, 26 Colony are of high quality.

4.7 Concluding Remarks

According to the latest information collected on milling industry in the major producing areas, there has been an expansion of milling capacity of mills and now the majority of the rice millers in these surveyed areas can be classified into medium scale based on the scale of their business. In Polonnaruwa, 75 percent of the mills are large scale and are located in Thamankaduwa and Hingurakgoda DS divisions. Also millers have adopted new technology to improve the quality of rice and to increase the efficiency of resource use.

The large scale and medium scale mills located at major paddy milling areas in Minneriya and Kaduruwela buy paddy from collectors who transport paddy from all areas of the district. Nearly 50 percent of the millers in Polonnaruwa purchased paddy from collectors while it was 35 percent in Kurunegala. It was observed that the collector was absent in marketing channel in Hambantota which indicates there was no middleman between the farmer and miller. The availability of medium scale rice mills uniformly distributed in all major producing areas in the Hambantota district was the main reason to this situation. However, the situation was different in Polonnaruwa district and collector dominated the purchasing activities. Most of the large scale and medium scale millers were concentrated in urban areas, and collectors active in long distance remote areas like Welikanda, Dimbulagala and Aralaganvila. When the overall situation is considered it was clear that dominant paddy buying procedure in all major producing areas was millers/ collectors buying paddy at farmgate and it is common when large millers are operative in buying paddy. According to the survey, a major problem faced by the millers during the purchasing process was high moisture content paddy supplied by the farmers. This problem is acute in producing areas in Ampara district.

Millers function not only as a rice producer or processor but also as the buyer, stock controller and as the wholesaler and retailer of rice too in many cases. Particularly, large scale millers have all the functions from farm gate up to the consumer. Large millers have modern machinery and likely to adopt new technologies. A majority of the large millers own large storage facilities. This vertical integration, mechanisation and use of modern technology has increased the miller's ability of buying large quantities of paddy at once and to maintain large paddy storage capacities that can influence the paddy market. This scale of the operation with increasing return to scale can increase the productive efficiency of milling operation as well.

Based on the physical concentration of the mills and the buying behaviour, few regions can de distinguished as independent regional paddy markets. Demand for paddy arising in large scale milling centred in Polonnaruwa with the supplies from major paddy producing areas in Polonnaruwa, Ampara, Anuradhapura and Kurunegala including Mahaweli areas represents the largest regional paddy market.

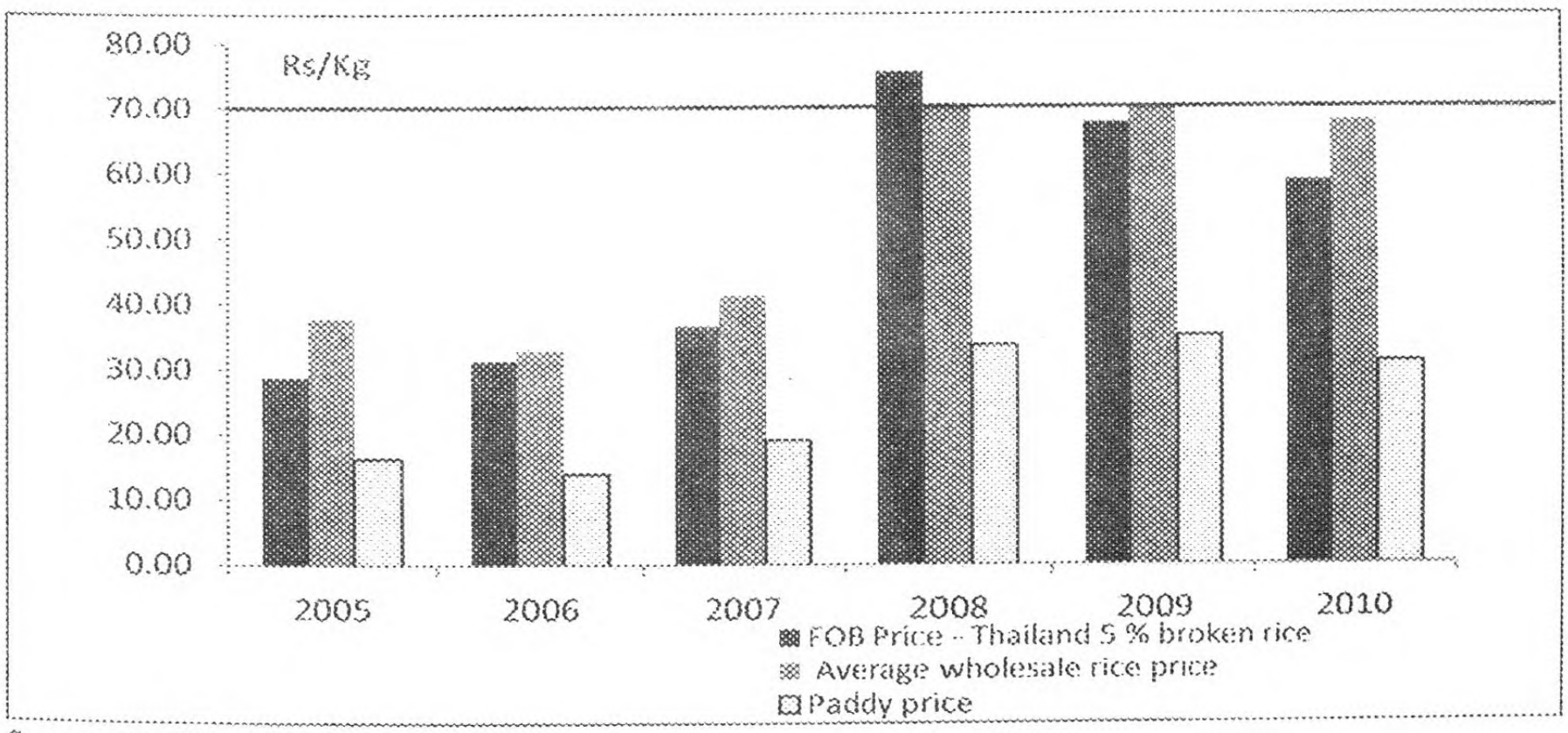
CHAPTER FIVE

Paddy Price Determination in the Regional Paddy Markets

This chapter deals with the main price determining factors of paddy. Determination of average price, inter seasonal price variability, intra seasonal price variability and intra-regional price variability of paddy are analysed in terms of these factors. World market price, domestic production, surplus disposal behaviour and regional supply, ceiling prices on rice, GPS for paddy and its operation are discussed first. Then the structure and the behaviour of market participants of the buyer side of the regional paddy markets are discussed. Analysing those factors with empirical evidence, last section of this chapter develops a structural model for price determination in regional paddy markets.

5.1 World Market Price and Ceiling Prices on Rice on the Average Paddy Price

It is evident from the recent data that the annual average wholesale prices of rice follow the general behaviour of the world market prices common to a small open economy. This annual average behaviour is exemplified in the local paddy market. When the behavior of average wholesale price of rice from 2005 to 2011 is considered, it is above the FOB price except during 2008, the year recorded the global fuel crisis. During the period from 2005 to 2011 the world market price transmission to the domestic market had been through the price signals that passed through imports including import duty of 35 percent except in year 2008.



Source: HARTI, 2012

Figure 5.1: World Market Price, Domestic Rice Price and Paddy Price

In April 2008 the government imposed a ceiling price for rice; 70 Rs/kg for samba rice and 65 Rs/kg for raw and nadu rice when word market prices shot up due to world food crisis. Due to the imposition of a ceiling price, domestic prices were able to keep below the ceiling price. However the branded rice continued to fetch a high price.

5.2 Local Paddy Supply and Price

Local availability of paddy stocks by means of production and by carryover stocks not only has an impact on determining of average price but also of the intra price variability within a year. As the supply drops, average price increases and vise- versa. Also in years with surpluses or deficits, price variability within the year increases (Table 5.1). One of the deficit years such as year 2007 has a high variability in its price that reflects in both paddy and rice markets. Similarly a year with surplus production experienced a relative variability in paddy and rice prices.

Table 5.1: Total Paddy Production, Average Price of Paddy and the Coefficient of Variation of Paddy and Rice Prices 2005-2010

	Total Production	Average Price of Short grain Paddy	CV of Prices		
			Paddy Price	Whole sale Price	Retail Price
2005	3246	16.25	14.9	11.1	10.8
2006	3341	14.01	11.2	8.5	5.8
2007	3131	19.14	**27.0**	**21.4**	**20.4**
2008	3875	33.71	8.9	6.8	6.5
2009	3652	35.11	10.5	7.0	4.1
2010	4301	31.14	**14.8**	**13.7**	**11.0**

Source: Department of Census and Statistics & HARTI

5.3 Seasonal Variation in Production and Price Variability

When the seasonal variation is considered, average *Yala* season prices is 5-10 percent higher than the *Maha* season prices as *Yala* produces only one third of the total production. But years with surpluses and deficits this variation deviates from the normal and in the year 2007 *Yala* season prices increased by nearly 50 percent compared to *Maha* season prices due to production drop in the *Yala* season by 6 percent compared to previous year. Similarly, in the year 2010 when both *Maha* and *Yala* production reached its peak, the average *Yala* season prices dropped by 12 percent (Table 5.2). However these price drops cannot be explained only in terms of the supply shift but other structural factors of the market is responsible and will be discussed later.

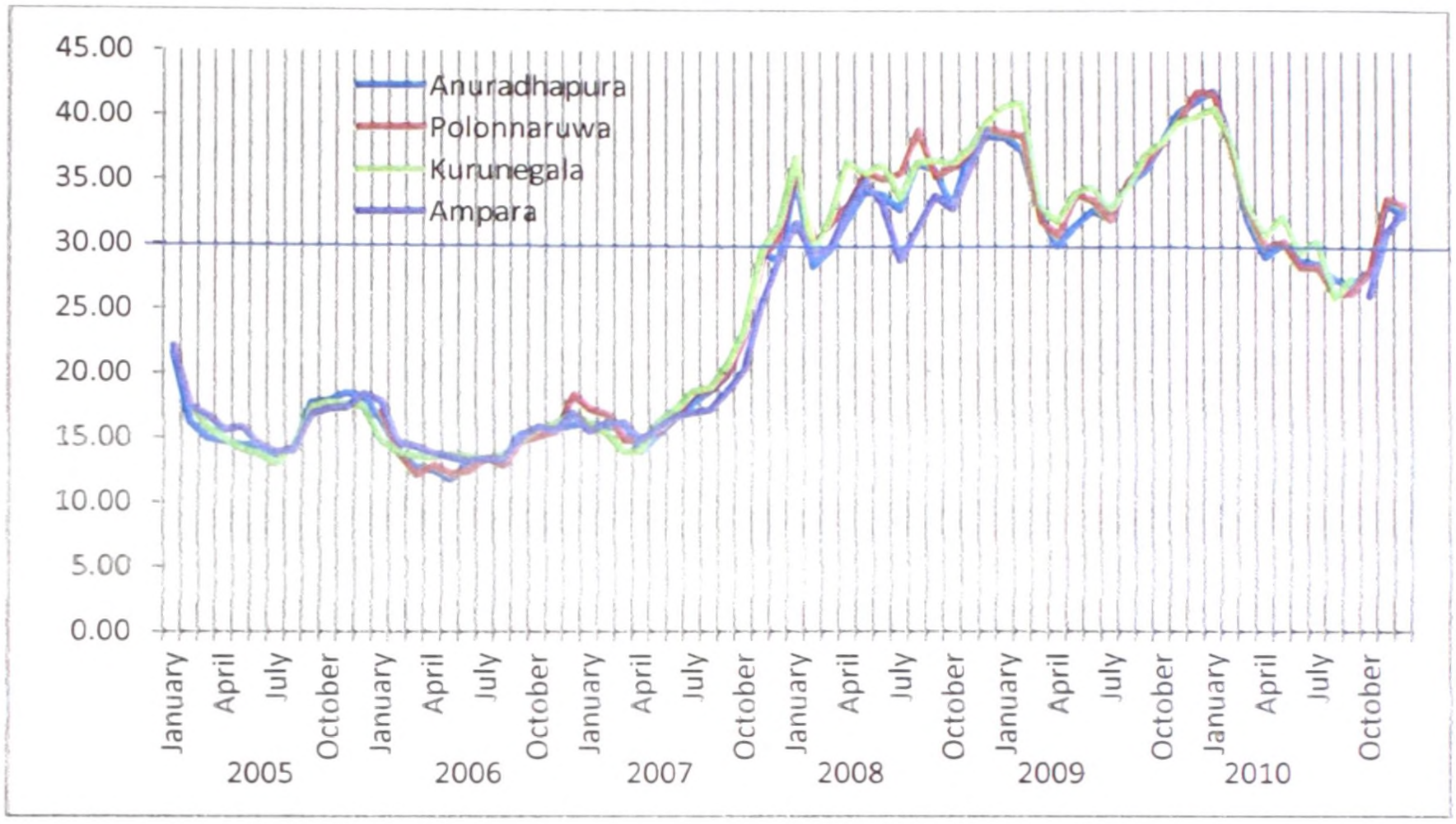
Table 5.2: Seasonal Paddy Production and Seasonal Average Price of Paddy

	Season	Paddy Production ('000 Mt)	Average Paddy Price (Rs/Kg)
2005	*Maha*	2013	15.94
	Yala	1233	16.55
2006	*Maha*	2136	13.27
	Yala	1206	14.75
2007	*Maha*	1973	15.51
	Yala	**1158**	**22.77**
2008	*Maha*	2125	32.05
	Yala	1750	35.38
2009	*Maha*	2384	33.47
	Yala	1268	36.75
2010	*Maha*	2630	33.10
	Yala	**1671**	**29.19**

Source: Department of Census and Statistics & HARTI

In general, immediately after the harvest the seasonal prices touch the lowest level when the marketing season reaches its peak. The maximum level is recorded during the off season. In a perfectly competitive market without any government intervention and with a perfect flow of information, seasonal price increase should be equal to storage cost only. In case there are market imperfections, storage decisions are based on expectations about annual supply and demand. In a particular season, if the output is less than the expected level, off season prices will rise by higher proportions. Alternatively, if the production is more than the expected level of output, prices in the off season will also remain subdued. Seasonal price changes, therefore vary from year to year, but are generally equal to the storage costs in the long run (Sharma & Kumar 2001).

When the monthly paddy price fluctuation in the last five years is concerned it is observed that the years with supply shifts, the price fluctuation is much higher than expected. In a normal year the seasonal monthly price variation ranges between Rs.5.00 – Rs.10.00/kg. In 2007, when supply shifted towards left due to bad weather, the paddy prices increased from Rs.15.00/kg to Rs.37.00/kg by 22 Rs/kg and in 2010 when the surplus production was achieved, the price dropped by nearly Rs.15.00/kg (Figure 5.2). Further price drops during 2009/10 *Maha* and 2010 *Yala* season were curtailed due to PMB interventions as described in other chapters.



Source: HARTI

Figure 5.2: Average Monthly Paddy Prices in Major Producing Areas, 2005-2010

5.4 Regional Supply, Surplus Disposal Behaviour of Farmers and Regional Price Variation

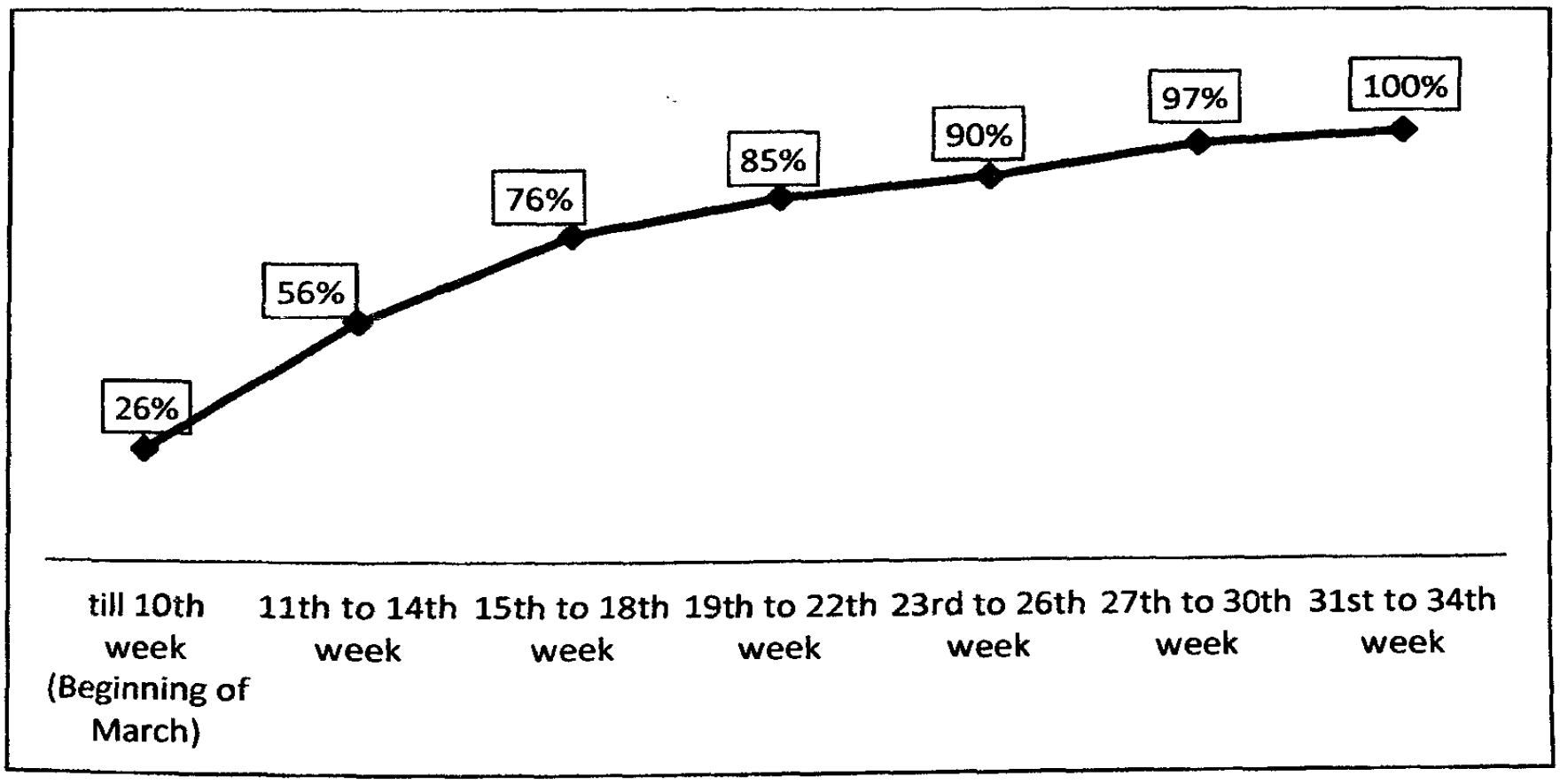
One of the other dimensions of prices is the spatial price variation and the factors primarily determining the price of paddy in the major producing areas are the regional production and its disposal behavior, hence the regional supply and the demand.

The major paddy producing areas that were covered in the survey together produces almost 60-65 percent of the production in the country (Table 5.3). Ampara, Polonnaruwa, and Anuradhapura districts including Mahaweli H alone produces 42% of the total *Maha* and *Yala* production. Their surplus disposal behavior is largely influential in terms of price determination during the season. It was noted in chapter 3 how the marketed surplus has been disposed by farmers. When the overall disposals in major producing areas are concerned, more than 75 percent of the total marketed surplus of *Maha* season had been disposed by the end of April. The remaining 25 percent which are stored by farmers are released to the market over a period of 3-4 months until the next *Yala* harvest begins (Figure 5.3).

Table 5.3: Percentage Paddy Production by District in *Maha* and *Yala* Seasons

District	2009/10 *Maha*	2010 *Yala*
Ampara	13.6	16.5
Polonnaruwa	10.8	15.7
Anuradhapura	12.2	5.4
Mahaweli H	5.5	4.7
Hambantota	4.5	6.5
Kurunegala	10.4	13.5
Major Producing Areas (1-6)	57.1	62.3
(1) + (2) + (3) + (4)	42.2	42.3

Source: Department of Census and Statistics



Source: Field Survey, 2010

Figure 5.3: Cumulative Disposal of Marketed Surplus of the Total Marketed Surplus by Sample Farmers in Major Producing Areas during 2009/10 *Maha* Season

The first price signal at the beginning of *Maha* harvest commences from Ampara district. Disposals of nearly 70 percent of the marketed surplus of *Maha* harvest soon after harvesting by Ampara farmers cause a sudden paddy price drop in the market which then gets transmitted into other areas (Table 5.4 and 5.5).

Table 5.4: Marketed Surplus and Producer Price in Sampling Areas by 4 Weeks Interval

Week of the Year	Hambantota		Kurunegala		Ampara		Polonnaruwa		Anuradhapura	
	Marketed Surplus (%)	Producer Price	Marketed Surplus (%)	Producer Price	Marketed Surplus (%)	Producer Price	Marketed Surplus (%)	Producer Price	Marketed Surplus (%)	Producer Price
Till 10th week	5	29.33	2	35.33	**69**	**27.94**	2	27	-	-
11th to 14th week	**52**	28.45	**44**	**32.03**	19	29.65	**21**	28.29	**35**	29.02
15th to 18th week	17	25.31	19	32.59	2	29.33	**45**	28.81	**25**	29.1
19th to 22nd week	5	24.2	8	28.39	0		15	26.88	21	26.62
23rd to 26th week	4	24.71	1	27	1	29.5	11	27.73	8	26
27th to 30th week	8	24.13	10	28.33	9	22	3	25.67	8	26.17
31st to 34th week	8	23	12	26.57	-	-	-	-	-	-
> 34										

Source: Field Survey, 2010

Table 5.5: Monthly Paddy Prices by Location, 2010

	Polonnaruwa		Anuradhpaura		Thambuththegama		Dehiathakandiya	
	Short grain	Long grain	Short grain	Long grain	Short grain	Long grain	Short grain	Long grain
January	41.53	37.60	41.80	35.79	42.94	36.93	41.70	37.60
February	37.55	29.99	37.94	30.38	38.33	31.40	37.55	30.10
March	32.44	24.46	31.61	25.95	31.60	26.59	32.00	24.80
April	29.56	25.03	28.84	25.70	29.63	26.66	29.80	24.88
May	30.03	25.94	29.88	26.35	30.59	27.44	30.18	25.80
June	28.00	23.13	28.53	24.00	28.48	23.97	28.03	22.73
July	28.05	22.78	28.31	22.78	29.25	23.78	27.90	22.55

Source: HARTI

The price movement over the season in Ampara, Anuradhapura and Polonnaruwa districts follows a more integrated pattern (Table 5.4 and 5.5) and the price movement in Kurunegala and Hambantota sample locations somewhat deviates from this pattern showing the regional variation of paddy market (Table 5.4).

When the regional paddy price and its variation are concerned, significant price differences are observed between Anuradhapura, Ampara and Polonnaruwa areas and the Kurunegala district as shown in the Table 5.4. Kurunegala farmers are getting a relatively better price. But prices received by the farmers in the major surplus producing areas; Anuradhapura, Ampara and Polonnaruwa are relatively low. Marketed surpluses from these areas are the main supplies to large scale milling industry that supply rice to meet the demand of Colombo main urban market.

5.5 Operation of GPS Price and Government Price Stabilization Programmes

Although the role of the government in paddy purchasing activities has been declining over the years, government procurement importantly contributed to the paddy price stabilization in the past. Even the surveyed year, government purchasing program was influential to marginally increase the drastically dropping prices experienced with the large surpluses arriving to the market. Although farmers viewed that the GPS paddy buying procedure has several shortcomings, it was an important assistance to farmers who stored paddy with the favorable price expectations. PMB operations were significant in the major producing areas and in particular in Ampara district that escalated the dropped prices by Rs.1.00-2.00 per kg and helped maintaining prices without further drop in other areas where peak harvesting was in progress. It is evident from the Table 5.4, that paddy prices particularly the long grain varieties (Table 5.5) are moving up from its lowest as the PMB started purchasing paddy from mid-March.

5.6 Structure and Behaviour of Regional Paddy Market and Its Influence on Paddy Price Determination

In the earlier sections of this chapter relate the temporal and spatial paddy price variation with respect to price formation factors; world market price, supply side factors such as national paddy production, regional supply (supply shift) and disposal behavior of paddy (price elasticity of supply) and the PMB intervention in purchasing. This section deals with structure and behaviour of milling industry, the main buyer's side of the market whose decisions that cause intra seasonal and inter regional paddy price variation.

5.6.1 Market Structure and Industry Concentration

Market structure refers to industry concentration, the extent of product differentiation, and the ease with which new firms can enter an industry. Market structure determines

firm or industry conduct, notably price determination. Market structure in the case of paddy is such that there are fewer millers of paddy than suppliers, which allows the millers to exert market power.

Distribution of paddy mills in the paddy producing areas and their physical concentration to one location has an influence on the paddy market as was evident from earlier chapters in terms of distribution of paddy mills in Hambantota and Polonnaruwa.

As it was revealed, large scale millers are concentrated in Polonnaruwa district and are operated in all the major producing areas in buying paddy. Large scale millers especially based in Hingurakgoda area buy large percent of paddy production of the year with their largest milling and storage capacity and market potentials for rice in the rice market. These large scale millers have specialized knowledge on the production, rice market, and linked network with paddy collectors, brokers and other channels in the paddy rice market. Most of the millers in the industry take price decisions based on those prominent large scale millers. On the other hands normally those large scale millers tend to buy high quality paddy with higher prices than other millers.

With the support of the empirical information collected from non-verified official sources, market power held by large scale millers in Polonnaruwa was tested by estimating the market concentration. Market concentration of the paddy/rice market is a measure of market dominance by a few large millers typically measured by the share of the marketed paddy surplus held by the largest firms in the milling industry.

The concentration indices used in measuring market concentration include:

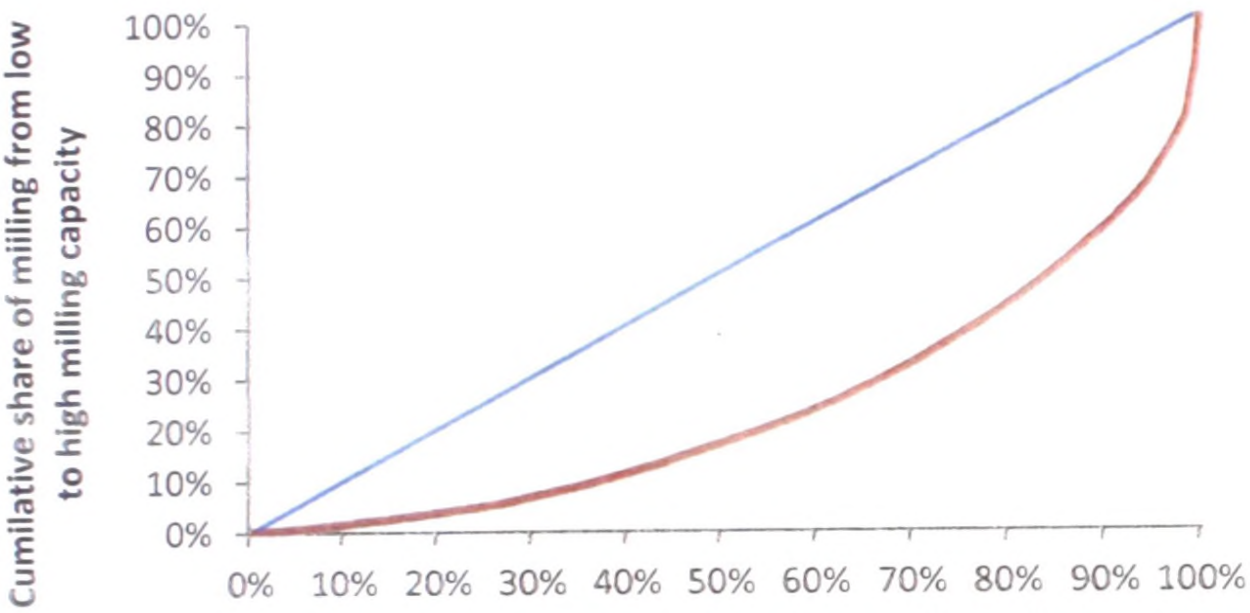
- Lorenz Curves and Gini Coefficient
- The k-firm concentration ratio (CR_k)
- Herfindahl-Hirschman Index (HHI)

The detail methodology of calculating these indices are given in the appendix 5.1. According to the available sources, information on 200 registered mills was used for the analysis. It was revealed during the field survey that 200 to 250 mills are distributed in the Polonnaruwa district. Hence the following analysis provides a more realistic situation on the milling industry/ buyer concentration in the Polonnaruwa regional paddy market.

Lorenz Curves and Gini Coefficient

Distribution of milling shares of the mills in Polonnaruwa is presented in the Lorenze curve and it shows that there is an unequal distribution in the milling industry and the market share held by the large scale millers is relatively large

(Figure 5.4). The value of the Gini coefficient is 0.53 indicating higher inequality in market shares held by millers in Polonnaruwa.



Source: Author's calculation

Figure 5.4: Cumulative Paddy Milling Quantity and the Cumulative Number of Millers in Polonnaruwa

The k-firm Concentration Ratio (CR_k)

In calculating k-firm concentration ratio, the share of largest 4 mills (CR4) and the share of largest 8 mills (CR8) in Polonnaruwa were considered. In calculating the share of the paddy harvest processed by millers, their daily milling capacity and the number of days in operation were considered. Table 5.6 presents the CR_k values.

Table 5.6: The k-firm Concentration Ratio (CR_k) of Milling Industry in Polonnaruwa

CR_k	Market share held by:	CR_k Value (%)
CR_4	Largest 4 mills	22
CR_8	Largest 8 mills	28

Source: Author's Calculation

Herfindahl-Hirschman Index (HHI)

In estimating the market concentration, Herfindahl-Hirschman index was calculated considering the market shares of 200 mills. Accordingly the index value was calculated as 202.

The degree of competition based on these index values and the usefulness of this statistic to detect and stop harmful market powers however are directly dependent on a proper definition of a particular market. In terms of industry concentration, the Gini coefficient is a relative measure of industry concentration as distinct from an absolute measures CR4 and HHI indices.

According to the calculations, the concentration indices of buyer's market in the regional paddy market in Polonnaruwa are CR4 of 22%, HHI of 202 and a GC of 0.53.

In general, the cut-off levels of the ratios for less concentrated/ un-concentrated but not competitive markets are HHI values of less than 1,000; CR4 of less than 75 percent and GC close to zero. According to the values, the buyer's market in Polonnaruwa shows a relatively large inequality in the distribution of milling shares by the GC values that are greater than 0.5. The largest four mills process 22 percent of the paddy marketed surplus and the largest 8 mills process 28 percent. According to the HHI value calculated, Polonnaruwa paddy market shows a less concentration in its buyer's market.

Accordingly the milling industry in Polonnaruwa which is the buyer's market of the Polonnaruwa regional paddy market is dominated by highly mechanised few large mills that nearly one fourth of the buyer's market dominated by four largest mills physically located/concentrated near the town area. To the fact that more than 200 fringe mills varying from large to small in size are located from centre to periphery, industry concentration index, HHI is not supportive the argument that there is an industry concentration in the buyer's market. Nevertheless including other concentration indices, it shows the paddy milling industry is less concentrated and should be under scrutiny.

In terms of product differentiation, large scale millers produce rice varieties with variable prices with a brand name for which market has a specific demand.

5.6.2 Vertical Integration, Horizontal Consolidation and Non Constant Return to Scale in Milling Industry

Vertical integration, horizontal consolidation and non- constant return to scale have been cited in the literature as the factors driving towards concentration of market power into few processors in lot of commodity markets (Azzam, et al., 1995). Horizontal consolidation refers to the number and size of firms that exist in a particular market. Vertical integration is a form of legal coordination under which a single organization controls two or more adjacent stages of production, processing, or marketing of a commodity, typically through ownership but also through contractual arrangements. The factors such as technology, infrastructure development have been largely influential in the consolidation and integration of processing and marketing functions over the years. Milling industry has evidenced large scale milling capacity machinery and other

machinery coming into the industry within the last few years. According to the field large scale milling industry is highly mechanized.

It could be presumed economies of scale in the milling industry are due to mechanization. Yet adequate information is not able to empirically support the decreasing cost with scale of operation.

5.6.3 Storage Function of Large Scale Millers

Short run supply elasticity of paddy is dependent on how the paddy marketed surplus is disposed during a season and the storage function of the farmer and the collector. When the storage function is considered, farmers dispose their produce immediately after harvesting in order to obtain cash to meet repayment obligations and because they lack storage facilities as described in the Chapter 3. According to field information, it was found most of the time collectors store paddy only for 3-4 days until they sell their stocks. At present the government sector has very limited storage facilities. According to the PMB annual reports, PMB storage capacity amounted to be 219,745 Mt (PMB, 2010). On the other hand, rice is not stored for more than one month due to its low keeping quality and therefore the storage of rice is limited.

Thus paddy is stored and paddy storage function has been taken over by the large scale millers owing to the storage capacity they developed in the recent past. Consequently, large scale millers with high storage capacity have gained their power in determining the behaviour of marketed surplus in the paddy market.

5.7 Exercising Oligopsony Market Power by Controlling of Paddy Purchases by Large Millers

A firm has market power if its share of purchases in the input market is sufficiently large that it can cause the market price to fall by purchasing less and cause it to rise by purchasing more. Exercising the oligopsony power in the paddy market is the ability of the large millers to influence the competitive paddy price by changing the total quantity purchased by the milling industry. Their storage decisions are based on expectations about annual supply and demand.

Some studies have implied whether large scale millers have gained the market power through the function of storage and have resulted large paddy price fluctuation in the Sri Lankan paddy market. An earlier study by Wickramasinghe & Dharmaratne (1999) have shown that in the paddy/rice price determination in Sri Lanka, large scale millers are at an advantageous position in exercising market power both in the rice market and paddy market. At the peak harvesting period that oligopsonic behaviour in the paddy market is unavoidable unless the government intervenes in the market.

With the onset of *Maha*, large stocks of paddy surpluses start to reach the market especially from Ampara at once where *Maha* harvesting first begins around March causing highly inelastic supply in the paddy market. Price of paddy is then determined by the intensity of buying operation by large millers. Prices can go extremely down when large scale millers or government purchasing is not operative. This can happen when the year is with surplus production. When surplus production caused farm price falling, large millers limit their buying and storing in large percentages. They let market decides the prices. Then prices will further go down calling government intervention in paddy purchasing as experienced in 2009/10 *Maha* season. In the absence of government procurement, paddy prices will be further depressed. The year 2010 *Maha* paddy prices fell to about Rs.20.00 per kg while the government has declared the purchasing price as Rs.28.00-30.00 per kg. Once the prices have fallen to its lowest, large millers then start purchasing paddy in large quantities by increasing the price by Rs.1.00-2.00 per kg.

When the exogenous shock such as bad weather causes leftward shift in farm supply, large millers intensify their buying operations by sending their own lorries to the farm gate. This created a very thin paddy market for other millers and consequently farm prices will increase sharply. Small millers cannot produce rice by purchasing paddy at higher prices and they stop milling.

Alternatively, exercising oligopoly powers in selling rice during surplus years is also noted by large scale millers. They strengthen the oligopoly power when farm price declines due to a rightward shift in farm supply by maintaining relatively elevated price at the retail market. According to the study by Wickramasinghe & Dharmaratne (1999), rice prices have been determined by the large scale millers based on the price at which rice milled by the small and medium scale millers who purchase paddy from the existing paddy market on regular basis when a thin paddy market exists during off-peak seasons and short supply years.

5.8 Concluding Remarks

Domestic paddy price fluctuations are subject to several factors. Being a small open economy, world market rice price fluctuations are exemplified in the paddy market. Apart from world market price signals, local production, seasonality, farmer's behaviour in disposing paddy, government regulatory prices i.e. ceiling price and GPP cause paddy price to vary in a year. The structure and the behaviour of market participants of the buyer side of the regional paddy market are the main factors for inter-regional and intra seasonal price variation. According to the structural explanation presented in this chapter, large millers in Polonnaruwa district exert oligopsony power causing a decline in farm value share and large price instability in paddy market.

CHAPTER SIX

Conclusion and Recommendations

Intra seasonal and inter regional price variation is the most disturbing factor in terms of the paddy price stabilization in the country. This is significant when supply shift occurs due to weather changes or other supply shift parameters. Therefore management of marketable surplus is vital in terms of paddy/rice price stabilization at both producer and consumer level. Marketable surplus could be managed to stabilize prices at various levels from farmer to collector to miller by adopting various strategies. Before prescribing alternative intervention strategies to manage the marketable surplus, it is important to understand the paddy price determination in Sri Lanka. In view of this, the study takes a positive approach to understand the paddy price determination at various levels from farmer to paddy processor. Although this study does not support with empirically estimated any statistical relationships, it adequately provides empirical evidence for a structural model with causative relationships to explain the paddy price determination in Sri Lanka.

Findings are based on primary data collected during 2010; the year recorded a surplus with active government intervention after many years of minimum intervention.

Main Findings of the Study

- There is about 4-10 Mt of marketable surplus at farm-gate in *Maha* season and about 2-6 Mt in *Yala* season in major producing areas. This figure increases up to 33 Mt in the areas such as Samanthurai in Amapara district. Marketable surplus is disposed mainly as distress sales, sales due to lack of storage and high moisture content of paddy and as price responsive sales. Marketing of paddy soon after harvesting is driven by large marketable surpluses, cash needs for repayment of loans, high moisture content of paddy, lack of storage facilities, immediate cash needs and to some extent the better price prevailing at the beginning of the season. The need for continuous cash income over the year, market speculations for better prices and the available storage capacity are the factors decisive for farmers to store paddy for future sales.

- Distress sales are common in Kurunegala and Hambantota districts primarily to pay back debt where small farmers are dominant. In particular due to the high content of moisture in Ampara paddy, farmers dispose their harvest early as possible. Marketed surplus of *Maha* is spread over a period of 3 months in Polonnaruwa and Anuradhpaura districts. Ampara and Polonnaruwa farmers had disposed almost the

total *Maha* harvest during the season and they stored *Yala* harvest anticipating a better price towards the end of the year until next *Maha*. More than 90 percent of Anuradhapura farmers had stored some amount of 2009/10 *Maha* paddy speculating a favourable price. During *Yala*, the lean production period, farmers store fairly a good proportion of the harvest to be sold over the season until the beginning of next *maha*.

- Farmers sell their surplus to village level collectors or to millers either at farm gate/house or by bringing their stocks to the mills. It is commonly observed that millers are operative in buying paddy in Hambantota, Kurunegala, Ampara and Polonnaruwa districts while village level collectors play a prominent role in Anuradhapura and also to some extent in Polonnaruwa. Frequently large millers buy paddy at farm-gate directly sending their Lorries to the farm or through village level collector. When a village level collector is operative in buying paddy, stocks are sold to the miller through a broker and he acts as an intermediary in the marketing channel. When small to medium scale millers are operative in buying paddy, often farmers carry their stocks to the mill as in the case of Kurunegala and Anuradhapura farmers. During *Yala* season the main buyers are small and medium scale millers.

- Stockholding agents/ collectors are no longer in the marketing channel. Stockholding function is with millers. More than 85 percent of the total marketable surplus of Ampara had been bought by millers within two months after *Maha* harvesting that begins in March. By this time, 54 percent of the total marketable surplus of *Maha* from the major producing areas is with the millers. Millers have the capacity to absorb 40-45 percent of the total marketable surplus within two months.

- The demand for paddy arises in the market due to three main buyers; large scale millers who sell branded paddy and operative throughout the year, small and medium scale millers who purchase paddy based on the prevailing market conditions and the government purchases at GPP. Accordingly, there are three kinds of demand in the market.

- According to the latest information collected on milling industry in the major producing areas, there has been an expansion of milling capacity of mills and now the majority of the rice millers in these surveyed areas can be classified into medium scale on the scale of their business. In Polonnaruwa, 75 percent of the mills have the milling capacity of more than 8 Mt per day and are located in Thamankaduwa and Hingurakgoda DS divisions. Also millers have adopted new technology to improve the quality of rice and to increase the efficiency of resource use.

- Millers function not only as rice producers or processors but also as the buyer, stock controller and as the wholesaler and retailer in many instances. Particularly, large scale millers have all the functions from farm gate up to the consumer. A majority of

the large millers own large storage facilities hence, they store paddy and mill at a late stage. This vertical integration, scale of the operation, mechanisation and use of modern technology tend to result in increasing economies of scale with large scale milling operations.

- Based on the physical concentration of the mills and the buying behaviour, few regions can de distinguished as independent regional paddy markets. Demand for paddy arising in large scale milling centred in Polonnaruwa with the supplies from major paddy producing areas in Polonnaruwa, Ampara, Anuradhapura and Kurunegala including Mahaweli areas represents the largest regional paddy market. Large scale millers especially based in Polonnaruwa buy a large share of paddy production of the year with their largest storage and milling capacity and market potentials for rice in the market. They have specialized knowledge on the production, rice market and are linked with paddy collectors, brokers and other channels in the paddy rice market. Concentration of this regional market measured in terms of CR4, CR8, Herfindhal and Gini coefficient shows Polonnaruwa buyers or the milling industry is concentrated to some extent that their buying behaviour is vital in paddy price determination.

- With the onset of *Maha*, large stocks of paddy surpluses start to reach the market especially from Ampara at once where *Maha* harvesting begins first. Based on the size and the disposal behavior of the marketable surplus, more inelastic supply of paddy is observed in Ampara during *Maha* season. This tends to create more inelastic supply with the onset of *Maha* that could lead to large price drops depending on the intensity of buying operation in the area. Prices can go extremely down when large scale millers or government purchasing is not operative. *Yala* season is characterized by price responsive disposal of marketable surplus or less inelastic supply in major producing areas. It is specific in Ampara district that more than 70 percent of its production is long grain white paddy. Thus, the paddy production in Ampara has a significant impact on the paddy/rice market price determination.

Conclusion

The study was conducted to understand the behaviour of marketed surplus and adequate empirical information was revealed to elicit the paddy price determination process in Sri Lanka. Distinct price behavior is observed in different regional paddy markets and the inter-regional price differences mainly depend on the structure and behavior of buyer side of the market.

Although Polonnaruwa regional paddy market is less concentrated according to the industry concentration indices, its physical concentration and cooperative decision making can exert market powers similar to a more concentrated market. Based on the findings it is imperative that large millers concentrated in Polonnaruwa exert market

power during the period of peak harvesting in Ampara when the supply is highly inelastic. These large mills can exert oligopsony power as their share of purchases in the paddy market is sufficiently large that it can cause the market price to fall by purchasing less during surplus seasons and cause it to rise by purchasing more during shortages. Speculation about marketed surplus is also a determining factor for their purchasing decisions. This market power can lead to repulsion of small millers and further consolidation and expansion of large millers.

If there is a competitive fringe of small buyers that compete in the paddy (input) market with few large buyers who work cooperatively, then the buyer market power of the dominant mills (firms) will be constrained not only by the elasticity of supply of the sellers in the paddy (input) market, but also by the fringe of small buyers. The more elastic the demand by the fringe, the more their purchases rise as the price falls, and the more difficult it will be for the dominant firm to exercise buyer side market power. The reduction in its demand, and hence the profits foregone, as it attempts to depress the price, will be greater as suppliers can instead substitute and sell to the fringe.

In the absence of competitive fringe of small to medium buyers, with a highly inelastic supply at the peak harvesting period, oligopsonic behaviour in the paddy market is unavoidable unless government intervene in the market.

Recommendations

1. Government intervention during the main price determining month March to April particularly in the main paddy producing areas in Ampara – This intervention could be either direct or indirect
2. Government buffer stock program should be designed to address the following;
   - More inelastic supply of paddy with the onset of *Maha* season and less inelastic supply after the peak harvesting and during *Yala* season
   - High moisture content of Ampara paddy due to large scale mechanized harvesting
   - Increasing economies of scale of large scale milling and productive efficiency gains due to increasing scale
   - Distribution of paddy mills in the paddy producing areas and their physical concentration to one location has an influence on the paddy market

3. Following measures are proposed to develop a competitive fringe of millers with more elastic/less inelastic demand
   - Increase the storage capacity of other medium size millers scattered in major producing areas
   - Registering millers under PMB to purchase paddy and for milling (Public private partnership)

4. Set up a facility for farmers to store paddy on hiring basis

Determination of marketed surplus and storage decisions by paddy farmers depends on several factors. Marketing of paddy soon after harvesting is driven by large marketable surpluses, cash needs for repayment of loans, high moisture content of paddy, lack of storage facilities, immediate cash needs and to some extent the better price prevailing at the beginning of the season. When the farmers dispose paddy due to the reasons such as lack of storage facilities and large marketable surpluses, farmers could be provided with storage facilities on hiring basis while maintaining their ownership/title of the stock. Farmers bear the risk of price fluctuation in the market.

5. Due consideration should be given to the following anti- competitive behavior in the paddy/ rice market

Declining importance of Colombo wholesale rice market where business is on commission basis and the increasing trend of vertical integration of paddy-rice market with brands while being rice is the staple food in Sri Lanka

Lack/absence of declared information on storage capacities of millers and the highly constrained access to such information

6. Further studies are recommended to carry out to estimate the changing supply elasticity in the short run, in particular; at the onset of *Maha* harvesting season when most of the paddy sales happen.

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Appendix Table 2.1: District wise Purchases of Paddy (1977- 1993) Mt

District	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Colombo	520	884	1206	30	2		12		1	2	5	2					
Gampaha				6			17			1							
Kalutara	1442	2105	1325	314	43	159	110	153	12	63	43	20					
Galle	2342	2691	924	39	51	37	7			4	14	2		7			
Matara	5544	8578	9485	297	237	50	302	41	43	63							
Hambantota	44611	46237	38425	8137	9568	5777	14105	1163	2296	2690	283	2781	85	424	14	9	667
Jaffna	12726	16076	14748	1035	52	354	5181	14	4			17		288			
Mullaitivu			9236	2288	238	698	9632	1302						81			
Vavuniya	14273	19555	17465	1114	251	1398	13083	2612	967		291	767		111	71	75	356
Mannar	18746	29443	25763	17354	155	413	8062	1492	113			9		51	159		
Batticaloa	30469	39245	24489	10599	10650	3209	29416	25056	415				8	120	8504	72	104
Anuradhapura	68717	93251	79120	31003	15875	8832	5836	30789	14671	50887	8829	33754	27	3576	10568	3925	9595
Polonnaruwa	100340	123238	94181	41914	20135	6489	42013	15503	14449	27162	12628	17794	56	5465	1666	521	6212
Trincomalee	42472	55187	46735	17884	13289	13775	36660	22595	11428	4668	2324	3852	16	3123	9321	88	3579
Ampara	70759	104154	70891	33934	25581	16221	624541	29782	23044	18181	15832	15554	3962	4412	3033	865	11022
Kandy	21420	20150	13709	8398	6676	7720	9393	9693	6318	4887	3895	7612	152	3461	3297	171	3891

District	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Matale	16972	19101	15220	8084	7851	4812	12928	9170	7170	7977	2598	4590	1	2380		154	1704
Nuwara Eliya	880	1919	1241	151	8										629		
Kurunegala	27393	31895	23580	3421	2811	2584	12550	4030	3436	12591	2012	3369	39	422	315	220	165
Puttalam	4336	4928	4647	1382	461	199	781	823	1412	4613	184	296	5	3	5255	41	86
Badulla	11111	17244	10593	8367	4945	2875	8526	7354	9070	12774	12596	9450	515	5489	1518	345	6944
Moneragala	11042	12967	12773	7538	5572	4424	5445	4456	4954	5283	2281	2316	180	892	18	53	1601
Ratnapura	4424	24155	22816	8090	3131	3445	7113	2154	19319	1484	76	2677		834			67
Kegalle	1811	1964	156		137	359	231	502	31	202	343	187					
Total ('000)	**512**	**675**	**539**	**211**	**128**	**84**	**846**	**169**	**119**	**154**	**64**	**105**	**5**	**31**	**44**	**7**	**46**

Source: Paddy Marketing Board

Appendix Table 3.1: Disposal of Surplus by Stage after Harvesting Over 2009/10 *Maha* Season

Stage after Harvesting (Within/By)	Anuradhapura		Ampara		Kurunegala		Polonnaruwa		Hambantota	
	Average (%)	Cumulative (%)	Average (%)	Cumulative (%)	Average (%)	Cumulative (%)	Average (%)	Cumulative (%)	Average (%)	Cumulative (%)
At the field	7	7	69	69	9	9	4	4	44	44
1st Week of Harvesting	23	30	3	73	24	33	20	23	19	63
2nd Week of Harvesting	17	47	7	80	20	53	18	42	7	70
Last two weeks of the 1st Month	25	72	9	89	19	72	31	72	5	75
2nd month of Harvesting	16	88	2	91	6	77	18	90	5	80
3rd Month of Harvesting	10	98	0	91	0	77	10	100	6	86
4th Month of Harvesting	2	100	1	91	2	79			3	89
5th Month of Harvesting			0	91	10	89			11	100
After 5 months			9	100	11	100				

Source: Field Survey, 2010

Appendix 5.1: Measuring Market Concentration

Market structure is the manner in which markets or industries are organized and it is largely dependent on the number of participants or firms in the market or industry and the extent of market control of each participant. Market concentration reflects the degree of competition in the market. It is the key element in market structure and an important determinant of conduct and performance and hence the type of competition. Market concentration is measured in terms of the proportion of the total market share accounted for by the top largest firms in an industry. It is a function of the number of firms and their respective shares of the total production or sales (Margetts, 2006).

Tirole (1998) put it that organizational economists summarize the distribution of market shares among firms by using concentration indices. These concentration indices used in measuring market concentration include:

Concentration Ratio,
Herfindahl-Hirschman Index (HHI),
Lorenz Curves and Gini Coefficient.

These indices are used in combination because practically any measure adopted cannot represent the relevant structural aspects of the market; the measures complement each other (Tirole, 1998). This means that comprehensive results cannot be drawn from one index.

The k-firm Concentration Ratio (CR_k)

The Concentration Ratio indicates the relative size of k-large firms in relation to their industry as a whole. It shows whether an industry is dominated by a few large firms or many small firms. Therefore, CR_k was used as an indicator of the relative size of firms in relation to the industry as a whole. Normally 4-firm and 8- firm concentration ratios are used conventionally.

The 4-firm concentration ratio (CR4) and the 8-firm

$$CR4 = \frac{\sum_{i=1}^{4} Si}{\sum_{i=1}^{n} Si} \times 100$$

$$CR8 = \frac{\sum_{i=1}^{8} Si}{\sum_{i=1}^{n} Si} \times 100$$

where n is the total number of firms in the industry, S_i is the percent market share or proportion of sales of the ith firm to the industry

The ratio has an upper limit of 100% which would be obtained if the k-largest firms accounted for all of the industrial sales. This is applicable in pure monopoly or monopsony. Thus, the more the market is dominated by a few large firms the large the concentration ratio will be. However, the Concentration Ratio suffers from certain drawbacks. For example, there is no justification for focusing on the market shares of the top 4 - firms rather than three or six. Thus, the choice of 4 - firm concentration ratio as the appropriate measure of concentration is somewhat arbitrary. It provides limited information about actual market structure. To take an extreme example, a market where the top four firms each having a market share of 22.5 percent would have a CR4 of 90 percent, so would a market where one firm has a market share of 60% and the other three firms with 10 percent each. The behaviour of firms may greatly differ in these two situations with very different competitive outcomes (Compecon Limited, 2002).

Herfindahl-Hirschman Index (HHI)

The term "HHI" means the Herfindahl–Hirschman Index, a commonly accepted measure of market concentration. The HHI is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers.

The HHI is calculated as follows:

$$HHI = \sum_{i=1}^{n} (S_i)^2$$

where S_i is the market share of firm i = 1,..., n.

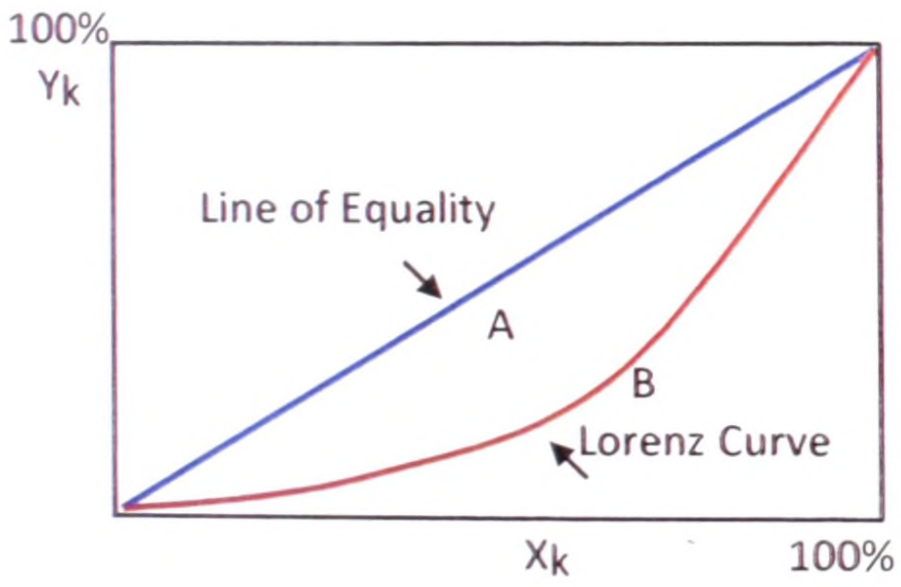
For example, for a market consisting of four firms with shares of 30, 30, 20, and 20 percent, the HHI is 2,600 ($30^2 + 30^2 + 20^2 + 20^2 = 2{,}600$). HHI includes all firms in the calculation. This means that more data needs to be collected. Squaring of the individual

market shares of the firms gives proportionately greater weight to the market shares of the larger firms. Lack of information about small firms is not critical because such firms do not affect the HHI significantly (Compecon Limited, 2002).

HHI ranges from a number approaching zero to 10,000. Non-concentration is indicated by HHI value of less than 1,000 and HHI of 10,000 implies high concentration, a case of pure monopoly or monopsony. The agencies generally consider markets in which the HHI is between 1,500 and 2,500 points to be moderately concentrated, and consider markets in which the HHI is in excess of 2,500 points to be highly concentrated.

Lorenz curves and Gini Coefficients (GC)

The Lorenz curve shows the quantitative relationship between the cumulative percentages of miller against the cumulative percentage of the volume of rice milled. To compute the cumulative percentage, the volume of paddy milled will be arranged from highest to lowest. The GINI coefficient or concentration ratio will be derived from the Lorenz curve. This measures the inequity in milling among the different millers.



Graphically, the GINI coefficient is the ratio of the area between the diagonal of the Lorenz curve as compared to the area of the half-square in which the curve lies.

Cumulative percentage of milling shares of the mills (Yk) were on the vertical axis and cumulative percentage of mills (Xk) on the horizontal axis. The GC was calculated as follows:

$$GC = A/ (A+B)$$

where A is the area between the Lorenz curve and the line of equality and B is the area under the Lorenz curve.

The GINI coefficient can be computed using the following formula:

$$G_r = 1 - \sum_{i=1}^{n-1}[(P_{i+1} - P_i)(S_i + S_{i+1})]$$

Where:

P_i: Cumulative percentage of paddy millers in the i^{th} class.

S_i: Cumulative percentage of the volume of rice milled in the i^{th} class.

G_r: Concentration ratio of rice traders in the market.

This ratio ranges from zero to one.

The Lorenz curve is a 45^0 straight line.

The Lorenz curve is a 90^0 rectangle.

BEHAVIOUR OF MARKETED SURPLUS IN PADDY PRICE DETERMINATION IN SRI LANKA

WASANTHI WICKRAMASINGHE
NALAKA WIJESURIYA
DUMINDA PRIYADARSHANA

Hector Kobbekaduwa Agrarian Research and Training Institute,
PO Box 1522,
Colombo,
Sri Lanka.
Tel. +94 11 2 6969 81
+94 11 2 6964 37
Fax. +94 11 2 6924 23
e-mail library@harti.lk
Web www.harti.gov.lk

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