Viability of Rice Processing at Household Level

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FOREWORD

An improvement in rice processing techniques was a long felt need in the traditional rice processing industry operating at household level. The Rice Processing Village (RPV) concept which commenced operations in July 2005 in Anuradhapura and Polonnaruwa districts was a planned intervention to fulfill this gap by incorporating improved technologies introduced by the Institute of Post Harvest Technologies (IPHT) to the industry while building the local capacities on entrepreneurship among rural rice processors. Strategically, the concept anticipates a shift from low quality rice to superior quality rice that fetches a reasonable income to the paddy producer while providing employment opportunities, especially for rural women. At a wider scale, its ultimate goal is to create regionalized domestic rice markets, as envisaged in "Mahinda Chinthana."

Having identified the importance of the project the HARTI carried out an evaluation study with a view to ascertain its viability. As expected, the majority of the entrepreneurs are women and rice processing has become a major income source for many of them. Major weakness that affected the performance of the project is the absence of marketing arrangements. Although the project was designed by integrating extension, credit and marketing the target was not achieved due to poor monitoring of the project. The report recognizes the importance of the project as a cottage industry and suggests a number of recommendations to meet the project objectives

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Authors

EXECUTIVE SUMMARY

"Mahinda Chinthana" development proposals envisaged to create regionalized domestic rice markets through Rice Processing Village (RPV) programme. The pilot programme on RPV concept commenced operations in July 2005 aiming at producing superior quality rice at household level through which returns to the paddy farmer can be increased as well as employment opportunities can be created especially for women. Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI) conducted this evaluation on the RPV programme to ascertain the viability of the concept along with its major technological interventions for extension in potential rice producing areas.

This study was largely based on data and information collected from a randomly selected sample consisting a 40% of the current entrepreneurs to analyze the cost effectiveness of the new technology and the status of its adoption. As revealed during the survey, the RPV concept has stepped into the village as an 'Integrated Approach' or an 'Intervention Package' which comprises (a) high quality rice processing technology that seeks to overcome the drawbacks of conventional rice processing methods (b) appropriate machinery for the same (c) financial assistance through small groups and (d) training on innovative marketing methods to face the challenges of marketing.

The process consists of a number of labour intensive activities from purchasing of paddy to selling of processed rice. It is largely a labour intensive activity where the family labour comprises virtually the entire labour component of which 60% are female family labour. On an average, the cost of rice processing between two contexts of processing, purchased paddy and owned paddy amounts to Rs. 7.41/kg and Rs. 7.05/kg respectively. The financial profitability of rice processing industry depends on the scale of operation, the prices of paddy and rice prices. It shows that larger the scale of operation, lower the paddy prices and higher the prices of processed rice the higher the profitability. The return to family labour accounts for Rs. 697.20/day under the general condition of operation. The profit margin from the rice processing at household level is largely dependent on the use of family labour throughout the process.

Motivation by the officials, availability of paddy and labour, credit facilities and group strength, quality of processed rice and proper market places and right prices appear to be vital for the continuance of the industry.

Gaps in technical know-how on the processing of quality products, an array of institutional problems from supply of credit to re-payment, limitations in acquiring essential equipment and infrastructure, rice marketing problems, high cost of processing and group weaknesses appear to be the sustainable issues of the concept. Another key determinant of profit from the industry is the frequently fluctuating price of paddy. In addition to this, de-stoners which are essential for producing good quality rice are not yet established in some villages, adversely affecting the quality of rice. Ultimately, entrepreneurs are left with no proper market facilities. Thus, the majority of rice processors are in the industry at a subsistence level due to all these constraints which impede them to achieve the desired advantages of economics of scale in the industry.

Overall, the achievement of set objectives is far below the expected level. Stemming from a multitude of constraints, the RPV concept has failed to create regionalized domestic markets for rice. It has also shown a limited capacity to solve the paddy marketing problem at rural

level. Gendered division of labour throughout the process has given significance to the industry as a family enterprise which can hardly be sustained only with the female labour.

Nevertheless, there is evidence to show that all these constraints spatially vary. One successful entrepreneur claimed that all these constraints could be surmounted. Therefore, such an effort should include involvement of adequate (Institute of Post Harvest Technology) cadre versed in the new technology at the rural level, introduction of a revolving fund, setting up of de-stoners and/or a credit line at low interest rates for the purchase of machinery and equipment, a strong propaganda campaign to popularize the quality of rice and an orientation in marketing.

Further, the proven ability of the new technology to produce high quality rice at a reasonable cost that benefits both processors and the consumers carries the most vital share for the sustenance of the industry at rural level. Apart from that, RPV concept assumes higher significance as an agro-based industry that is capable of mainstreaming the idle family labour, in particular female family labour, into rural economy in an appropriate manner. Therefore, the study recommends that the replication of the RPV concept devoid of the above gaps and constraints has the potential for solving a number of issues in the paddy production and marketing sector in Sri Lanka.

ABBREVIATIONS

AI	- Agricultural Instructor
ARPA	- Agricultural Research and Production Assistant
COP	- Cost of Production
DAD	- Department of Agrarian Development
DOA	- Department of Agriculture
DS	- Divisional Secretary
FO	- Farmer Organization
G.C.E. (A/L)	- General Certificate of Education (Advanced Level)
G.C.E. (O/L)	- General Certificate of Education (Ordinary Level)
GDP	- Gross Domestic Production
HARTI	- Hector Kobbekaduwa Agrarian Research and Training Institute
IPHT	- Institute of Post Harvest Technology
NGO	- Non Governmental Organization
OPPU	- Own Paddy Processing Unit
PPPU	- Purchased Paddy Processing Unit
RDB	- Rajarata Development Bank
RPV	- Rice Processing Village

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CHAPTER ONE

Introduction

1.1 The Background to the Study

As envisaged in the "Mahinda Chintana" development proposals, one among many of the strategies to overcome the key issues in the paddy sector is to create regionalized domestic rice markets through the Rice Processing Village (RPV) concept. This concept was introduced mainly for increasing the farmer income and satisfying the consumer preference to quality rice at a lower cost. In addition, it was seen as a source of self-employment in the rural community, especially for women.

To convert the RPV concept into practice, it was required to address the multitude of drawbacks in the traditional rice processing industry at the village level. Introduction of an improved parboiling method to produce quality rice and provide good returns to the producers became an overriding concern since the conventional par-boiling methods were associated with several shortcomings. In addition, credit, infrastructure, labour and raw materials were among the other needy components to make the RPV concept a reality.

The Institute of Post Harvest Technology (IPHT) developed an improved technology to make improvements to the conventional parboiling and milling methods. With the integration of this new technology, the RPV concept commenced operation in January 2005 in selected villages in the Anuradhapura and Polonnaruwa districts. This study is an attempt to evaluate the RPV programme in the context of creating regionalized domestic rice markets at village level.

1.2 Rice Processing Village Programme in the Context of Paddy Sector Issues

Paddy accounted for 3% of the gross domestic production and 10.4% of agricultural GDP in 2006 at the constant factor price of 1996 (Central Bank of Sri Lanka, 2006). Rice accounts for 20% of the monthly per capita food expenditure in the rural and estate sectors while in the urban sector it accounts for only 13% (Central Bank of Sri Lanka, 2003/2004). Rice nutritionally supplies 45% of the calorie requirement and 40% of the protein requirement (Palipane, 2003).

Paddy farming, being a direct source of income to the majority of the rural people especially in the dry zone, is also an indirect source of income for those involved in various operations in paddy production. Thus, the paddy sector has always held sway in economic and nutritional terms both at the national and the household levels and has received the highest priority in the development agenda in the Sri Lankan Economy.

Over time the paddy sector has seen a rapid transition from the traditional mode to commercial production for many reasons. The adoption of new methods, following the green revolution, extensive investment on irrigation and land settlement schemes and other infrastructure development undertaken at different periods of time since Independence largely backed by policy orientation towards self-sufficiency in paddy production were the key interventions in the paddy sector. At the same time, the continuous efforts taken by the Department of Agriculture in research, training, and extension services, the fertilizer subsidy scheme and other relief measures also contributed to the multitude of achievements in the paddy sector from varietals improvement to increased productivity. However, the production of paddy has stagnated during the last couple of years.

The high cost of production and the low returns stemming from the lack of proper marketing channels for paddy are the two major problems confronting the farmers. Paddy production generally deemed to be unprofitable in a vital sector of the rural economy as rice is the staple food of the Sri Lankans. It is also the largest mono crop grown in the island.

From the point of view of the consumers, the rice prices in the open market have also been steadily increasing. During the last couple of years, the production of paddy has stagnated, and there is an increasing trend of importation[1] of rice due to various reasons. The domestic production of rice was 3.07 million metric tons whereas the imported amount of rice was 51,000 metric tons in the year 2003 (Central Bank of Sri Lanka, 2004). The increasing cost of production coupled with import of the rice and other food items has resulted in a drop of farmer's income giving rise to a growing problem in the paddy sector in Sri Lanka.

In our effort to overcome the problem, the government put forward various incentive schemes to help both the consumer and the paddy farmer. Rice millers were given loans with extended repayment periods to modernize the mills. So that they could buy more paddy from the farmers and store the produce. Also modernized mills were to be set up to produce quality rice for the benefit of the consumer. A paddy-purchasing scheme was introduced in 2005 under which the government purchased a certain quantity of paddy through Co-operatives, the Agrarian Service Centers and the Farmer Organizations. The Ministry of Agriculture Development and Agrarian Services sought a new development strategy of creating regionalized domestic rice markets as a means of addressing the above problems to a certain extent. This study was aimed at evaluating the pilot project for the RPV concept to ascertain the problems and constraints the farmers countenanced prior to the extension of the concept in other potential areas of the country.

1.3 Research Objectives

1.3.1 Overall Objective

Carry out an evaluation on the successes/failures of the Rice Processing Village (RPV) programme along with its major technological interventions to determine the viability of the concept for extension in potential rice producing areas.

1.3.2 Specific Objectives

a. To analyze the cost effectiveness of the new technology and the status of its adoption by the entrepreneurs.
b. To ascertain the problems and constraints impacted on the sustainability of the RPV programme at village level.
c. To examine the future potential of the RPV programme along with the new technology as a strategy for creating employment opportunities with special reference to women.
d. To make appropriate recommendations for the replication of the RPV programme in rice producing areas.

1.4 The Study Location and Sites

The RPV programme was first introduced in January 2005 in 09 villages from Anuradhapura district and 02 villages from Polonnaruwa district. Therefore, both districts

[1] 14,848.8 MT in 2000, 51,956.8 MT in 2001, 95,099.8 MT in 2002, 34,401.1 MT in 2003 and 221,665.6 MT in 2004 rice has been imported (Source: Department of Customs, 2005).

were chosen as the study location. All the villages (11) from the two districts were chosen as study sites for detailed data and information collection.

1.5 Research Methods

Taking into consideration the objectives of the study, a number of study methods were in use inclusive of both primary and secondary data collection.

Collection of primary data through farmer group discussions and questionnaire surveys was the main focus. Focus group discussions were held to collect specific information on the farmer's attitudes and hands on experience with regard to the new technology covering a number of aspects such as strengths, problems and weaknesses. A structured questionnaire was administered to collect quantitative data on farmer's economy and the survey was carried out from February 2006 to May 2006.

Both published and unpublished literature formed the sources for the collection of vital information pertaining to the RPV concept, its implementation and data on cost of paddy and rice production in the study area.

1.6 Sample Selection

According to the IPHT, the total numbers of entrepreneurs were 122 at the time of survey. A 40% sample from each village was selected for the field survey based on the lists of entrepreneurs provided by the IPHT. Accordingly, the total sample size was 49 entrepreneurs randomly selected from each village.

1.7 Organization of the Report

The report is organized into 5 sections: Chapter one deals with the introduction to the study. Chapter two details out the status of the paddy industry in the study location and the implementation of the RPV programme. In chapter three the profile of beneficiaries and the functioning of the rice processing programme are discussed. Chapter four gives an insight into the gaps and constraints faced by the entrepreneurs and other determinants that have an impact on the viability of the industry. Finally, chapter 5 concludes the study by providing appropriate recommendations towards more practicable means of implementing the programme.

CHAPTER TWO

Execution of Rice Processing Village Programme in Study Location

2.1 Introduction

The RPV programme was first implemented in the Anuradhapura and Polonnaruwa districts which are two prominent paddy producing areas in the country. This chapter discusses the status of the paddy industry in the study location and the implementation process of the RPV programme in the area.

2.2 Status of Paddy Industry in the Study Location

Paddy is a crop grown almost in all parts of the country with Anuradhapura, Polonnaruwa, Ampara and Kurunegala forming the four major paddy-producing districts which account for nearly 50% of the annual production. According to statistics, nearly 19-23% of paddy produced in Sri Lanka is from two major districts, Anuradhapura and Polonnaruwa (Department of Census and Statistics, 2006). The contribution from the Polonnaruwa district is comparatively higher than that of the Anuradhapura district for both seasons *maha* and *yala*.

Of the total paddy production for the Anuradhapura district for the year 2006, 25% was in *yala* and 74% in *maha*, a trend commonly observable for other years as well (annex table 2.1). In contrast, in Polonnaruwa, the variation between *maha* (52%) and *yala* (48%) registers only a small difference.

2.2.1 Cost of Paddy Production

Present day paddy cultivation has suffered a series of setbacks ranging from increasing cost of inputs, fluctuating farm gate prices to marketing and depriving the farmers of the correct price for their produce. The factors that affect the cost are briefed below so as to understand the problems, which lead to the spiraling cost of production.

Table 2.1: Cost of Cultivation per Acre of Paddy (Irrigated) in Polonnaruwa and Anuradhapura Districts by Season (Five Year Annual Average)

Operations	Polonnaruwa				Anuradhapura			
	Yala		*Maha*		*Yala*		*Maha*	
	Rs	%	Rs	%	Rs	%	Rs	%
Labour Cost (Rs./ac)	9,542.3	50.3	8,780.20	49.1	9,263.70	52.0	8,621.40	50.5
Machinery and Equipment (Rs./ac)	4,373.70	23.1	4,233.40	23.7	3,783.30	21.3	3,928.60	23.0
Material Cost (Rs./ac)								
1. Seed	983.50	5.2	949.30	5.3	968.20	5.5	1,020.90	6.0
2. Fertilizer	2,743.20	14.5	2,509.60	14.0	2,429.10	13.6	2,438.20	14.3
3. Chemicals	1,313.40	6.9	1415.50	7.9	1357.50	7.6	1,078.40	6.3
Total Cost (Rs./ac)	18,956.	100	17,888.0	100	17,802	100	17,087.40	100
Yield (kg./ac.)	2,035.20		1,928.10		1,878.70		1,863.90	
Unit Cost (Rs./kg)	9.31		9.28		9.47		9.17	
Producer Price (Rs./kg)	13.30		11.80		12.20		11.70	

Source: Department of Agriculture, 2004

The 5 year annual average of the cost of production (COP) of paddy for the period from 2000 to 2004 in the Anuradhapura and Polonnaruwa districts is presented in the table 2.1. Labour cost accounts for approximately 50% of the production cost in both areas for both

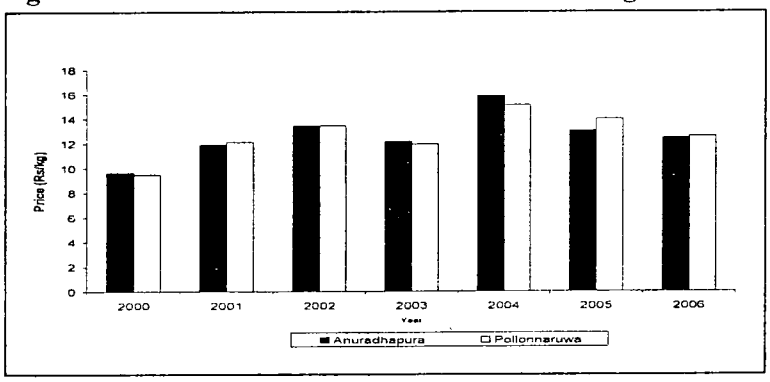
seasons, making it the largest component of the COP (the use of hired labour in field operations). The next seems to be the machinery cost amounting to some 23% of the total COP, mainly due to the increasing cost of fuel. Fertilizer too is a costly input accounting for about 14%. However, the government issue of a fertilizer subsidy has to some extent reduced the COP. The costs of chemicals and seeds are 7% and 5% respectively. Grossly the farmers in both districts need around Rs.18,000/= for the cultivation of one acre of paddy. The variation between the two districts by season is almost negligible. However, the unit cost is a little more than Rs.9.00/kg. The increasing wage rate has also impacted on the cost of labour.

2.2.2 Trend in Paddy Prices

Figures 2.1 and 2.2 show the annual variation of producer prices of paddy during the last five-year period in these two districts for long grain and short grain (white). Except for year 2003 which recorded a significant decrease in the farm gate price, there is an increasing trend over the years.

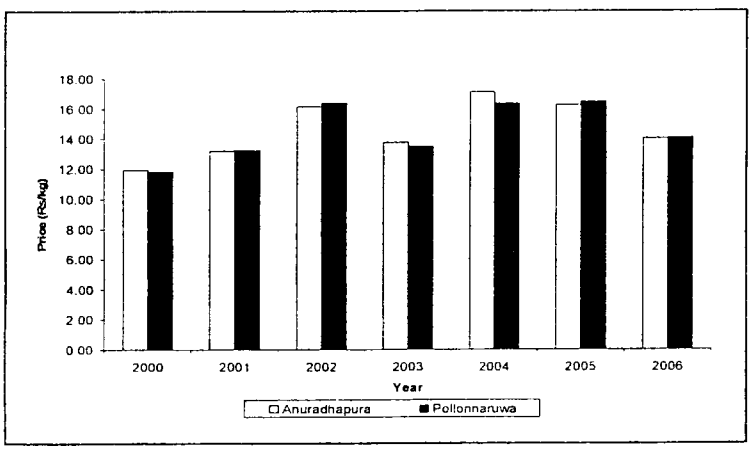
In 2003, the paddy output recorded an all time high due to favourable weather conditions and cessation of hostilities in the Northern and Eastern Provinces, but there was a reduction in the farm gate price as there was information of inflated output than the actual production which contributed to a drop in the farm gate price (Central Bank of Sri Lanka, 2003).

Figure 2.1 : Variation in Farm Gate Price of Long Grain Paddy



Source: Department of Census and Statistics, 2006

Figure 2.2 : Variation in Farm Gate Price of Short Grain Paddy



Source: Department of Census and Statistics, 2006

In 2004, the extent cultivated was lower than the other years due to a prevalent drought and a decline in imports in the first three quarters of the year. This created a shortfall in supply which led to an increase in the farm gate price for the farmer (Central Bank of Sri Lanka, 2004). In 2005, the extent of cultivation increased, boosted by the attractive farm gate prices in 2004 and improved cultivation practices plus good weather conditions, but the situation led to a drop in the farm gate price.

Apart from the annual variation, the prices fluctuate seasonally both for paddy and rice impacting on both the farmers and the consumers. Figures 2.3 and 2.4 show the variation in seasonal price index (Box 1) of paddy and rice prices of samba and nadu varieties for the period from 2002 to 2006 in the Anuradhapura district.

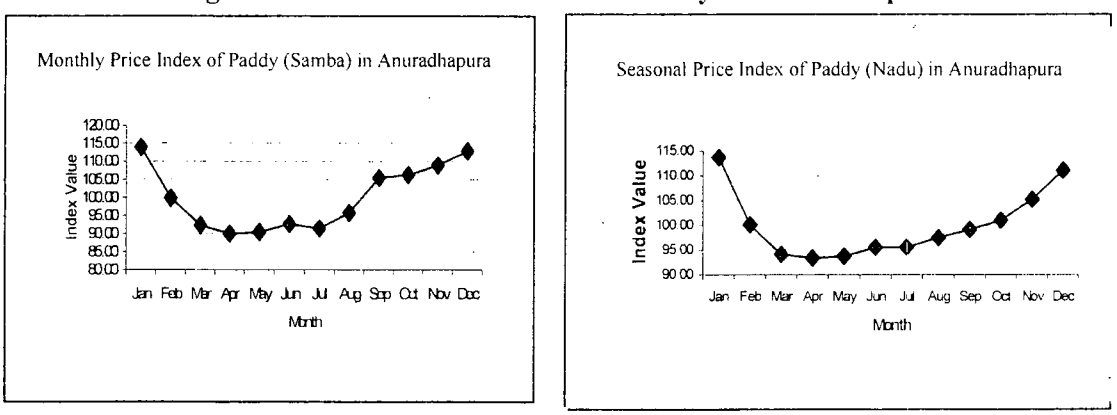
Box 1: The Index Value

The index value is the total value of the price aggregate taken at current prices. This is calculated by averaging through the years 2002 -2006 for every month (Annex Table 2.2 to 2.5) and then aggregate is averaged and is set at 100. For example the index value of (annex table 2.4) February: 100 divided by 35.30*38.55 = 109.20.

Variation in price depends on the supply of rice to the market and not on the monthly consumption of rice which marks only a monthly variation. Sixty seven percent (67%) of the annual national production of paddy comes from the *maha* cultivation which is sufficient until the *yala* harvest (Cassam.M and Newman, 1983). There is no price increase of paddy till October. The *yala* harvest which produces only around 30% creates a demand since the produce is in short supply. During the *yala* with mill owners buying and storing paddy for future use, the escalating demand creates an increase in the prices of rice and paddy.

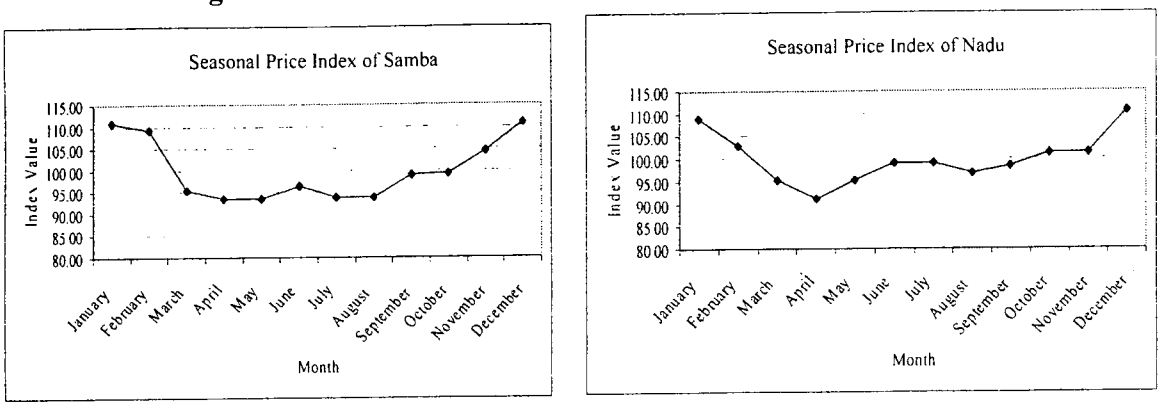
From April to July, after the *maha* harvest, the paddy prices tend to decrease with the influx of paddy in the market. From May through September, the prices are more or less stable with April recording the lowest prices. Rice prices continue to increase from November to February with December showing the highest prices. From January onwards, the paddy wholesalers release their paddy stocks so that they could buy the *maha* crops and with the result there is a price drop.

Figure 2.3: Seasonal Price Index of Paddy in Anuradhapura



Source: Food Information Bulletin 2002-2006, HARTI

Figure 2.4: Seasonal Price Index of Rice in Anuradhapura



Source: Food Information Bulletin 2002-2006, HARTI.

2.2.3 Profitability of Paddy Industry

Table 2.2: Cost of Paddy Production in Anuradhapura and Polonnaruwa Districts

	Polonnaruwa (Rs/kg)					Anuradhapura (Rs/kg)				
	COP *	COP**	Producer Price	Profit*	Profit**	Cost *	Cost**	Producer Price	Profit*	Profit**
Maha (2004/2005)	11.41	8.32	13.67	2.26	5.35	9.55	6.10	14.86	5.31	8.76
Yala (2004)	9.62	6.05	18.57	8.95	12.52	#9.49	#6.65	12.20	2.70	5.55

* With imputed cost of labour # 4 year average data (2000-2003)

** Without imputed cost of labour

Source: Department of Agriculture, 2005/2006

When the producer cost is taken into account, the profit obtained by the farmers shows that if own labour is used, the COP can be reduced considerably. Profit in Polonnaruwa excluding labour is Rs.5.35/kg for the *maha* and Rs.12.52/kg for the *yala*. If the labour cost is included the drop is by more than Rs.3.00/kg. The same applies for the Anuradhapura district (table 2.2). Wage rates for both from 1999/2000 *maha* to 2004 *yala* have registered a steady increase from Rs.210/= to Rs.302/= (Department of Agriculture, 2001-2005).

2.2.4 Other Problems in Paddy Industry

Marketing

Whatever steps taken by the government sector to safeguard the producer, the paddy marketing has become an acute problem to a majority of the farmers, who do not receive a reasonable price for their crop.

The paddy marketing channel begins at the point of purchase of paddy at the farm level by the collector which is then processed at the mills and finally sold by the wholesalers and the retailers to the consumers. Marketing is mainly handled by the private sector (nearly 80% of produce) at three levels, the farm, the wholesale and the retail. The government sector only operates at the farm and the retail levels.

Large scale millers who are also middlemen between the farmer and the consumer predominate the private sector as a key decision maker (box 2.2) in the paddy marketing industry. These millers play a dominant role in purchasing, milling, marketing and storing

of paddy. Large-scale millers have different channels for paddy purchasing, institutional channels, through the middlemen and also direct purchasing. However, the blame for purchasing paddy at a price not fair to the farmer is always laid on the millers.

Box 2.2: Paddy Milling Industry

The largest agro-based industry in the country is rice milling. Mills can be divided into three categories depending on the scale of operation; small scales (do not possess any storing facilities and improved technologies), medium-scale and large-scale mills (equipped with stores and improved technology). There are around 230 medium to large scale mills in the paddy producing areas. Over 95% of mills are owned by the private sector. There are two main forms of mills in Sri Lanka, the custom and commercial rice mills. Custom mills are the small mills, characterized by the use of conventional technology, and milling is for rural home consumption, while the commercial mills purchase and store paddy and produce rice for sale in the open market. Tissamaharama and Ambalantota in the Hambantota district, Kalmunai and Samanthurai in the Ampara district and Maradagahamulla in the Gampaha district are some of the regions where the largest numbers of commercial mills are located.

The commercial mills can be divided into three types depending on the machinery; traditional mills (only de-husking and polishing operation), semi modern mills (dehusking is done by rubber roll and polishing by steel hullers) and the modern mills (pre-cleaning de-stoning, polishing and grading are all done by machines).

It is well known that during the harvesting time the price declines rapidly creating many difficulties to the farmers. From the side of the millers they too face several problems, such as inability to buy paddy at the required standard, high transport cost, storage losses, lack of capital and high cost of labour.

Since 2003, there has been a surplus of paddy among the farmers, the reasons for which are many: unexpected high harvest, rice being imported for tsunami victims. This has created a problem to the farmers, who have been unable to sell their harvest at a reasonable price. As a solution for this surplus paddy, the government tried to help mill owners to purchase more paddy by waver taxes for rice processors. A zero duty was imposed for import of any machinery used by rice mill owners, plus unlimited credit facilities (Daily News, April 21, 2006).

Quality of Rice

With the increased consumer awareness and need for better quality food products, there has been a crying need to improve the quality of rice. This is a must if we are to consider exporting the excess production. In a bid to realize this achievement the IPHT has introduced optimum soaking times for different types of paddy, long grain 48 hrs and short grain (samba) 24 hrs. Another factor recommended by the IPHT is to produce good quality rice where the need to use certified seed to produce paddy which contains 14% moisture before selling or transferring for storage and also the request that paddy be mechanically threshed and winnowed on clean floors. Paddy when processed to rice has a recovery of only 60% – 65% in the custom and semi-modern mills, while in more modern mills, it is as high as 70% (Palipane, 2003).

In Sri Lanka, rice is consumed in two forms raw rice and par-boiled rice. Nearly 70% of rice in Sri Lanka is par-boiled. The main advantages in par-boiling are the higher milling recovery, higher nutrition value and where the grains are less liable to break unlike in raw rice.

In comparison to other Asian rice producing countries, the rice produced in Sri Lanka is of poor quality due to the higher percentage of discolored grains, bad odour and also the sub

quality of paddy available in the market. The present parboiling techniques utilized by most mills such as soaking of paddy for long periods of time and uneven spread of paddy during the steaming process are said to be adversely affecting the quality of rice, resulting in a higher percentage of broken grains, grains with blackened discolouration of the rice seed and a bad odour.

In the wholesale market, rice is categorized into different grades depending on its size and colour of grain, moisture context, and degree of broken rice, foreign matter and processing stage. The annex table 2.6 presents the official standardization and grading system given by the Sri Lanka Standard Institute.

2.2.5 Alternatives to the Problems

To mitigate all these problems, one of the strategies put forward was the introduction of value addition for paddy with better arrangements for marketing of the produce. The new development strategy for creating regionalized domestic rice markets was a novel approach to address most of these problems. This strategy was executed by means of processing paddy at household level to produce quality rice, which could be marketed under the Rice Processing Village Programme.

2.3 Rice Processing Village Programme

The Rice Processing Village (RPV) programme was envisaged to increase the farmer income at the farm level, create employment opportunities at the rural level and provide good quality rice to the consumers. It was a difficult task to achieve all these objectives in the absence of an integrated approach to surmount the aforesaid drawbacks in the rice sector at the rural level. Thus, the RPV programme along with a package of interventions commenced operations in July 2005 at Hiripitiyagama in the Ipalogama DS area of Anuradhapura district and extended to other villages in the Anuradhapura and Polonnaruwa districts.

Suitable villages were chosen taking several criteria into account:

1. Availability of paddy in the area.
2. Active participation of the farmers in the field extension programmes of the Department of Agriculture (DOA).
3. Willingness to implement the processing of rice at household level
4. Interest of the Agricultural Instructor (AI) in the area.

Table 2.3 and the annex table 2.7 illustrate the initial set up of the RPV programme and it is followed by a description of its vital components.

2.3.1 Group Formation and Capacity Building

This concept was designed with a view to establishing 1-5 farmer groups processing paddy at the village level. The farmers from the villages were chosen by the AI in the area. The interested individuals were exposed to an awareness programme after which an initial training exercise was organized and conducted. At this programme, the trainees were taught both the technical and the practical aspects of the new technology.

Table 2.3: Rice Processing Villages by Divisional Secretariat (DS), Village and Group

Divisional Secretariat	Village	Group Name	No. of Members
Anuradhapura District			
1. Nuwara Gam Palatha (Central)	Nuwarawewa	Parakrama	19
2. Nuwara Gam Palatha (East)	Kuttampokuna	Prathibha	14
3. Nachchaduwa	Nachchaduwa	Ekamuthu	21
4. Rajangana	Rajangana Right Bank	Prebeda	16
5. Giribawa	Rajangana Left Bank	Suriya	15
6. Ipalogama	1. Pallekagama 2. Hiripitiyagama	Randahabindu Samagi	09 20
7. Galnewa	1. Negampaha 2. Siyambalewa	Sikura -	16 10
8. Nochchiyagama	Andarawewa	Mahasen	14
9. Galewela	Watagala	1. Pragathi 2. Swashakthi	09 13
10. Rambewa	Thamara Halmillewa	Thambarawila	10
Polonnaruwa District			
1. Hingurakgoda	Girithale Colony	Janani	10

Source: HARTI Survey Data, 2006

At the village level, the main processing group consisted of 10-20 members, who were re-grouped into 3-5 members per group for the purpose of obtaining credit facilities from the financial institutions, mainly the banks. It was estimated by the IPHT that 150-200 kg/day of paddy would be parboiled by each member of the group. It was also envisaged that two young members from each village with G.C.E. (Ordinary Level) qualifications would be given an additional training on marketing so as to help the entrepreneurs in the sale of their produce, and in the co-ordination of the programme in the village. Necessary technical know-how and assistance in obtaining finance was an added incentive to the village mill owner who was trained by the IPHT.

2.3.2 Credit and Other Institutional Assistance

Under the guidance of the Ministry of Agriculture, the RPV programme is implemented with the support from relevant institutions for training, group formation, supply of credit and other assistance. Among the many institutions the IPHT, the DOA and the Department of Agrarian Development (DAD), Private and State Banks in the area, Farmer Organizations (FOs) and Non Governmental Organizations (NGOs) are expected to play different roles in the implementation of the programme.

Credit is one of the important supporting services for most types of micro enterprises. Since micro entrepreneurs generally lack capital, some kind of financial assistance was needed to put the project in place. In the RPV programme, the credit was required for purchasing paddy to start the project and construct necessary equipment and structures such as the hearth and the soaking tanks. Another objective of implementing a credit scheme is to encourage the farmers to keep their paddy stocks for rice processing, by avoiding immediate sale after the harvest.

2.3.3 The New Par-boiling Method

Introduction of the new par-boiling technology that overcame the drawbacks of the conventional par-boiling was the most vital component of the RPV programme. The new technology developed by the IPHT was to be disseminated at the village level by the IPHT in collaboration with the Department of Agriculture.

As recognized by the IPHT, more than 30,000 farmer families at the village level are engaged in rice processing using conventional par-boiling methods. Most of the drawbacks of the conventional par-boiling method such as bad odour and discolouration of rice were eliminated by this technology. The IPHT vision was to introduce this technology to the rural farmers as a self-employed agro-based industry enabling the farmers to generate a higher income by selling value added rice instead of paddy. It was also envisaged to produce rice of a superior quality, to the consumer at a lesser price with the integration of this new technology plus the addition of appropriate machinery to the small-scale mills.

Rice processing involves several operations as given below:

Sieving and Washing

Sieving is the initial step in paddy processing for cleaning of the paddy and removal of broken seeds. Then paddy is washed before soaking. It is recommended to use No. 5–6 sieves for long paddy varieties whereas No. 7–10 sieves for short paddy varieties. In general, these sieves could be used for 5 years.

Soaking

Soaking is essential before boiling according to the IPHT, as this helps to remove immature and the black grains of rice. The sieved paddy is then soaked in the soaking tanks, for 24 to 36 hours for short seeds and 48 hours for long seeds. The water in the tanks needs to be changed every 12 hours, to avoid the paddy from acquiring a bad odour which is prevalent in rice produced from paddy soaked in water for longer periods of time. This is one of the weaknesses found in the traditional parboiling system. As recommended by the IPHT, 2 tanks per household are needed since this would make the process of soaking and washing of the paddy more convenient. The tanks last for nearly a decade.

Boiling

The IPHT technology has introduced a specially designed aluminum barrel with a capacity of 22.5 gallons in which the paddy should be boiled until the seed ruptures. Four inches (4") from the bottom of the barrel, there is a welded support on which a No.10 mesh is placed. The barrel which lasts for a period of four years costs Rs. 3,500.00 and initially entrepreneurs purchased it directly from the IPHT, but now they are turned out at other manufacturing units. The boiled paddy should be covered with a wet gunny bag in order to prevent release of steam from the barrel. This new technology helps to produce better/good quality rice.

Drying

Under this new technology, partial drying of boiled rice on a cemented floor is an essential activity to maintain the quality of rice. For this purpose, the paddy is continuously mixed or turned over. At this stage, the moisture content of paddy should be 20%. Then the partially dried paddy is covered with gunny bags or mats and kept for two hours and finally air dried (not under direct sunlight) in an open space generally done indoors on a clean floor. The IPHT recommends 100 ft^2 floor space for the drying of 100 kg of boiled paddy.

2.3.4 Milling for High Quality

Milling which includes de-husking, polishing and de-stoning is indispensable for producing high quality rice.

A survey by the IPHT highlights that a majority of rice mills in the rural areas are small-scale mills equipped with traditional unimproved machinery which does not have the technology or the capacity to turn out quality rice. In addition, the conventional method of par-boiling rice, produces a high degree of white bellies (part of the grain is chalky) and poor milling quality is responsible for a greater amount of breakages and impurities. The rice processing entrepreneurs were to use this improved mill which with a de-stoner could be utilized by groups consisting of 10-20 farmer families in each village.

At the initial stages of the programme, each village was to be provided with a modern mill or improve one village level custom rice mill by introducing improved and new machinery.

CHAPTER THREE

The Profile of Entrepreneurs and Operation of the Enterprise

3.1 Introduction

Hundreds and millions of poor people in poor countries make their living as micro-entrepreneurs, which make up a large part of the informal economy (World Bank Report, 2005). The success of such enterprises is determined by a number of factors. While the personal characteristics of the entrepreneurs are crucial in making particular decisions on the status of the enterprise, how the entrepreneurs handle certain activities and manage the available resources for the success of the enterprise matters too. Therefore, this chapter first describes the characteristics of entrepreneurs, and then tries to reveal how they allocate and manage resources for the enterprises with the institutional support given under the RPV programme.

3.2 The Profile of Entrepreneurs

3.2.1 Age and Sex-wise Distribution of Entrepreneurs

The total sample comprised 49 entrepreneurs from the 13 villages. Of the 49 entrepreneurs, (randomly selected) 36 or 73% were women. The larger number of women entrepreneurs could be related to the fact that most women have traditionally been par-boiling paddy at home prior to the project, and with the introduction of this new technology, it was the women who were enthusiastic to participate in the project.

The age structure as shown in table 3.1 indicates that 49% of the entrepreneurs are in the age category of 36-50 years, while 31% are above 50 years. This could be attributed to the fact that since the enterprise requires more labour hours, the individuals (especially women) who have school-going children will have the time to pursue the enterprise.

Table 3.1: Age and Sex wise Distribution of Entrepreneurs

Age Group	No. of Males (%)	No. of Females (%)	Total (%)
20 –35	2 (15.4)	7 (19.4)	9 (18.3)
36 – 50	4 (30.8)	20 (55.5)	24 (49.0)
51- 65	6 (46.1)	9 (25.0)	15 (30.6)
Over 65	1 (7.7)	-	1 (2.0)
Total	13 (100)	36 (99.9)	49 (99.9)

Source: HARTI Survey Data, 2006

3.2.2 Level of Education of Entrepreneurs

The educational attainment of the entrepreneurs as shown in table 3.2 indicates that all entrepreneurs have received a primary education which is compulsory in Sri Lanka. A larger percentage (55%) has a secondary level education. Of the total sample, 41% have received education up to the General Certificate of Education, Ordinary Level [GCE (O/L)] or higher. One of the aims of the project was to utilize the capabilities of the GCE (O/L) qualified entrepreneurs to help in finding marketing links to sell the value added rice.

Table 3.2: Level of Education of Entrepreneurs by Sex

Level of Education	Males		Females		Total	
	No.	%	No.	%	No.	%
Primary	1	7.7	1	2.8	2	4.1
Secondary	6	46.2	21	58.3	27	55.1
GCE (O/L)	5	38.5	10	27.8	15	30.6
GCE (A/L)	1	7.7	4	11.1	5	10.2
Total	13	100.0	36	100.0	49	100.0

Source: HARTI Survey Data, 2006

3.2.3 Family Size

A majority of entrepreneurs (around 71%) have 4-5 members in their household (Table 3.3). Only 8% of the sample families have 6 or more members. As the enterprise is labour intensive, the larger the size of the household, the easier the task of processing of paddy. In the families where the family size is 4 and above, all members have assisted in various tasks involved in the processing, obviating the need for hired labour.

Table 3.3: Distribution of Families by Family Size within the Sample Household

Family Size (Members)	No. of Families	% of Families
2-3	10	20.4
4-5	35	71.4
6-7	3	6.1
8 and Above	1	2.1
Total	49	100.0

Source: HARTI Survey Data, 2006

3.2.4 Employment

Paddy cultivation is the main source of income of the farmers in the study area. The employment status of the sample entrepreneurs (Table 3.4) revealed that there are 18 women involved in rice processing as their primary source of income. According to the survey findings, all these women were previously unemployed. There are also 24 persons (men and women) primarily involved in the sale of vegetables, farming and sewing and selling of clothes, and currently involved in rice processing as a secondary means of employment. Both these groups have been able to utilize their unused time in a productive manner by involving in this activity and thereby increasing the family income. They have become capable of managing their time for rice processing in various ways; early commencement of regular household duties, late night work and working expeditely (completing other duties in a shorter space of time).

Table 3.4: The Employment Status of the Sample Population

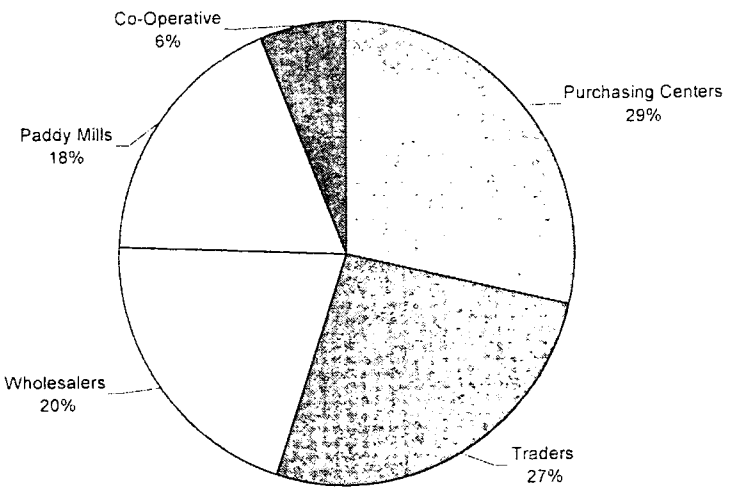
Employment	Major Employment		Secondary Employment	
	Male	Female	Male	Female
Farming	8	15	1	2
Rice Processing	4	18	8	16
Business	-	2	1	-
Trading	1	1	1	-
Sewing	-		-	1
Not Reported	-		2	17
Total	13	36	13	36

Source: HARTI Survey Data, 2006

3.2.5. Paddy Production and Marketing prior to the RPV Programme

It was observed that various channels have been used by these respondents for selling the surplus paddy prior to joining the RPV programme. There is a private trader in the village who buys paddy and resells and also there are traders who come to the village at the time of harvest to make their purchases. The other marketing channels are the wholesaler in the city or the paddy mill owners. As illustrated in the figure 3.1 which represents the main choice of the entrepreneurs, a majority has preferred the private dealers in the village and the visiting traders, while 20% had sold the paddy to the wholesalers in the city prior to the project. In the absence of a tangible course of action on the part of the government to purchase paddy, the private sector remains dominant in the sphere of paddy marketing. In Girithale and Nachchaduwa, the entrepreneurs reported that they sold the produce directly to the mill owners in the village. Usually the farmers resort to more than one source for marketing depending on the available price. The paddy marketing problems experienced by the farmers are presented in the table 3.5.

Figure 3.1: Share of Paddy Marketing Channels



Source: HARTI Survey Data, 2006

Table 3.5: Paddy Marketing Problems prior to RPV Programme

Problem	No. of Responses
Decline of prices during the harvesting period	17
Not receiving guaranteed price	16
Strict quality control	6
Limited purchasing	1
Frauds in weighing	1
High transport cost	1
Delay in money transaction	1
Total	43

Source: HARTI Survey Data, 2006

The price decline during the harvesting period is said to be the most pressing problem they face as producers. The adoption of strict quality control by the state sector is another snag the farmers have run into. Farmers are also compelled to sell their produce immediately after the harvest to meet their cash requirements to settle loans taken during the production season.

Figure 3.1 and the table 3.5 illustrate that the majority of the respondents depend on the private sector comprising the village collectors, wholesale traders, mill owners and visiting traders for the sale of their paddy. But, in their transactions with the private sources, the farmers are not assessed of a fair price. The paucity of government paddy purchasing centers allows the private sector to hold sway in the paddy marketing sphere.

3.3 Operational Status of RPV Programme in the Study Location

3.3.1 Participation in Training Programmes

Although 249 participants have undergone the initial awareness training programme on the RPV concept, only 196 have completed the follow up training. At the time of the survey, in early 2006, only 122 were engaged in the rice processing industry. The interest the farmers displayed in the project at the beginning petered out with a dropout rate of 49% due to a number of reasons. The initial investment for the enterprise, around Rs. 35,000/ per entrepreneur was not affordable to some participants. In addition, inability to devote their time because of other employment avenues and lack of assistance and supervision from the officials was the discouraging factors. The most serious impediment was the lack of a ready market which led some entrepreneurs to abandon the enterprise.

The initial training programme of the IPHT on the use of new parboiling and milling methods was held for the participants at their own village. It was a 2-day programme in which all aspects of rice processing were detailed. All the entrepreneurs of the sample but one from Thamarahalmillewa who became interested in the technology after observing other entrepreneurs in the village had participated in this training programme. Eighty five percent of the trainees were satisfied with regard to the success and usefulness of the training received. After the initial awareness programme, groups were formed at each village. Capacity building among the entrepreneurs was based on a theoretical training on rice processing followed by a demonstration of the new technology by the IPHT officials at each site.

3.3.2 Institutional Support Sought by the Entrepreneurs

The design of RPV programme, required the involvement of IPHT, DOA, DAD, RDB, FOs and other organizations working in the area. The table 3.8 reveals the variety of services rendered by the institutions to the participants along with an indication on awareness of the entrepreneurs about different institutions.

Not all the entrepreneurs were aware of the different organizations which assisted them in the various aspects of the programme. It is apparent from the table 3.6 that the AI of the DOA has given the fullest assistance in promoting the rice processing industry at the village level and providing necessary assistance to the IPHT in forming rice-processing groups. The IPHT has done a great deal in giving technical training and making arrangements for obtaining credit facilities to the entrepreneurs. The Rajarata Development Bank (RDB) has provided credit facilities to the members to commence the enterprise. The programme was introduced to the interested parties in the Rajangana Left Bank through the World Vision, an international NGO which was working in the area. This organization provided the credit

facilities and helped the entrepreneurs to co-ordinate activities with other institutions. In Nochchiyagama, the enterprise was introduced through the Farmer Organization of the area.

Table 3.6: Farmers' Awareness on Type of Assistance Given by the Institutions

Services Rendered	No. of Respondents					
	IPHT	DOA	RDB	FO	NGO	DAD
Introduction of the project to farmers	-	34	-	1	4	-
Providing advise to form groups	-	14	-	-	-	-
Technical training, supervision and monitoring	48					-
Providing credit facilities	-	-	37	-	4	-
Co-ordinating and assisting among institutions	-	29	-	-	4	5

Source: HARTI Survey Data, 2006

The Agricultural Research and Production Assistants (ARPAs) attached to the DAD are also expected to take greater responsibility in the co-ordination among the institutions at the grass-root level as they act as the link between the farming community and the rest of the related institutions providing services to the rural .agriculture sector. In case of Nuwarawewa, the ARPA was actively involved in the promotion of the new enterprise with the entrepreneurs achieving a remarkable success.

A special credit scheme was negotiated by the IPHT and the Development Bank of the area for the benefit of the groups. Two institutions, RDB and the World Vision were involved in providing financial assistance. The RDB provided credit to the needed members of the rice processing villages in Anuradhapura district, while the World Vision provided credit to the Rajangana Left Bank rice processing groups through their village society.

The survey reveals that only 65% of the respondents depended on credit facilities. The primary objective of this credit scheme was to help these rural producers with the initial capital required to launch the enterprise. Negotiations helped to lay the foundation for viable credit system at a reasonable low interest rate and on easy terms and conditions. Following components were incorporated into the credit system, which the RDB introduced to these members:

- Short-term loan facilities for purchasing paddy and basic utensils
- Reduced interest rates
- No private guarantees needed

Under the normal procedures for bank loans, the RDB required two guarantees as security of the loans. For the rice processing groups, special credit facilities were given at a very low interest rate of 8% per annum, with a condition for re-payment within a year. Each member who obtained credit required two securities from the fellow members from their three member groups. Except for this surety, no other securities were required, but some branches (Thambuttegama and Gonapathirawa) have taken over the deed of a land for surety. However, the deed was not legally mortgaged with the bank.

In Rajangana Left Bank, the World Vision was engaged in working to uplift the economic status of the poor, through its village level society namely "Bambare Rural Development Services Society Limited". The society consisted of 144 members. It had used its financial assets provided by the World Vision as a revolving fund for income generating activities of

the members to finance the RPV programme. The total value of the barrels was directly paid by the society to the IPHT in cash. The members involved in rice processing willingly re-paid Rs.2,000/= each to the society to be used as a revolving fund. In addition, the society gave a credit line to the members to initiate the micro enterprise. A loan of Rs.15,000/= each was given for the purchase of paddy to commence the project. This was given at very low monthly interest rate of 1% with a repayment period of 6 months payable in equal amounts. The society also expected to issue Rs.25,000/- each for paddy purchasing in the next season to the members who had started the micro enterprise.

Table 3.7: Loans Granted to the Rice Processing Groups by the RDB Branches

RDB Branch	Rice Processing Village	No. of Members	Total Value of the Loans (Rs)
1. Gonapathirawa	Hiripitiyagama	25	750,000.00
	Pallekagama		
2. Thalawa	Andarawewa	12	360,000.00
	Nachchaduwa	14	415,000.00
3. Medawachchiya	Thamara Halmillewa	8	120,000.00
4. Galnewa	Dewahuwa	15	375,000.00
5. Thambuttegama	Rajangana Right Bund	9	253,000.00
6. Anuradhapura Town	Nuwarawewa	23	690,000.00
	Kuttampokuna	11	300,000.00
Total		117	2,889,000.00

Source: HARTI Survey Data, 2006

The credit given was in the range of Rs.15,000/= - Rs.30,000/= depending on the requirement of the groups. The repayment period was 6-12 months. The RDB had decided to implement this scheme considering the project as an income generating activity implemented for the rural poor.

As shown in table 3.7, the RDB had provided credit worth Rs.2.9 million to 117 members and at the time of the survey, about 70% of the total amount had been recovered. Recovery rate was satisfactory in most of the villages.

Under this credit scheme, the only collateral requirement was the signatures of the three members of the group. In all villages, the peer groups consisted of 3 members each, whereas a 5 member peer group functioned in Rajangana Left Bank World Vision Society.

3.3.3 Use of Equipment and Other Infrastructure

The rice processing industry requires a number of equipment, but at the operational level, there are many variations in the use of the equipment and infrastructure. Table 3.8 shows the availability of such essential items among the entrepreneurs in the sample. Accordingly, most of the entrepreneurs run the enterprise with a severe shortage of essential equipment, largely due to financial difficulties to purchase them.

Table 3.8: Availability of Equipment among the Entrepreneurs

Equipment	Available Entrepreneurs	
	No.	%
Drying floor	13	27
Sieves	15	31
Hearth	49	100
Barrel	48	98
Soaking tank	29	59
Sealer	2	4
Salladiya	15	31
Balance	7	14
Alternative for drying	15	31
Access to modern mill	27	55

Source: HARTI Survey Data, 2006

As pointed out by some of the entrepreneurs, they have left out the sieves as they purchase clean paddy. The use of soaking tanks is reported by 29 producers and some of them have constructed their tanks in accordance with the technical specification given by the IPHT. Others have resorted to alternative soaking equipment such as plastic barrels and large aluminium pots. Only one entrepreneur had used a borrowed barrel. 55% of the entrepreneurs had access to modernized mills in their own villages, most of which did not come under the purview of the RPV programme but were setup for commercial purposes in the area.

All the entrepreneurs have constructed hearths with family labour and raw materials already available in their surroundings. The majority of entrepreneurs used firewood collected from their home gardens.

It was revealed that only 13 producers (26%) have used cemented floors for drying, while the rest have used mats or other alternatives. Lack of financial resources and suitable places that receive direct sunlight in the home garden are the two main reasons for the entrepreneurs to postpone or delay the construction of drying floor, compelling them to rely on the low cost alternatives such as mats. As most of these entrepreneurs being new investors, they have given preference to other essential components when making investment decisions. Those who own drying floors have constructed them according to no uniform standard and therefore costs vary. The estimated cost of construction of the drying floor is Rs. 8,473/= per 100 ft^2 according to the survey data. Only one producer who followed the IPHT specifications has constructed a 100 ft^2 drying floor at the cost of Rs 16,700/=. Some have applied cement on already existing floors without preparing the floor according to the recommended specifications.

3.3.4 Paddy: Sources and Prices

Paddy used for rice processing has two origins; own paddy produced and stored in the households and paddy purchased during the harvesting season and stored in the households. Accordingly, rice processing at village level could be broadly categorized into two different types based on the origin of raw materials used; **Own Paddy Processing Units (OPPU)** and **Purchased Paddy Processing Units (PPPU)**.

The paddy used for processing needs to be properly dried, uniform in size and texture and not discoloured.

At the time of sample survey a huge variation in paddy prices was observed ranging from Rs. 9.00 to Rs.17.50/kg .The guaranteed price of Rs 17.50/kg was set by the government but none of the farmers had the opportunity to sell their paddy at this price, as the market price was far less than the guaranteed price. Most of the processors had purchased 1kg of paddy at Rs. 9/= to Rs.10/= but some have purchased at Rs.17.50 averaging Rs.13.41/kg.

3.3.5 Labour Use in Rice Processing

Rice processing at household level is largely a labour intensive activity where family labour is mostly used. All the entrepreneurs in the 11 villages had soaked a total of 10,002.5 kg in their last operation, the average of which amounted to 204.13 kg/operation (5.8 barrels). However, the majority of entrepreneurs had soaked 175 kg in their last operation. The labour use for the processing of the quantity of paddy soaked in the last operation is presented in the table 3.9, along with the labour use per barrel of paddy processed.

Table 3.9: Labour Use in Rice Processing

Quantity Processed	Types of Labour Used (Man Days)				
	Family			Hired	Total
	Male	Female	Child	Male	
10002.5 kg of paddy	52.73	89.39	0.5	0.06	142.68
105 kg of paddy	0.55	0.93	N	N	1.51
35 kg of paddy	0.20	0.31	N	N	0.05 (4 hrs)
% of labour use for 35 kg	40.00	60.00	N	N	NR

N - Negligible NR – Not Relevant

Source: HARTI Field Survey, 2006

According to the data presented in the table 3.9, the family labour comprises virtually the entire labour component of which 60% are female family labour. The use of hired labour is just negligible, and was seen only in the Rajanganaya Right Bank rice-processing village, where the hired labour use amounts to 0.06 man days for the total quantity of paddy processed by the sample entrepreneurs. As shown under the sample characteristics, the majority of the families consisted of more than 4 members and 75% of the total sample were adults. Thus, the abundant availability of family labour would have been a supportive factor for the execution of this family venture successfully.

A number of labour intensive activities are associated with the rice processing, the cost of which was, consequently calculated by grouping all these activities under six broad categories as shown in the table 3.10. Included are Purchasing (purchase of paddy and transportation to the processing place), Storage (storage at households), Pre-processing (sieving, cleaning, washing, soaking, getting rid the water), Boiling (boiling, collecting fire wood, sun drying and drying in cool breeze), Milling (transportation for milling, milling and drying in cool breeze) and Packing (packing and marketing). The largest labour cost component is for boiling which involves labour from the time of boiling or steaming of the paddy, collection of wood, sun drying of the steamed paddy and then drying of the milled rice. This is generally carried out in between the other household activities by the women in the household. The other component is packing which also involves the time spent on marketing of produce. There is a variation by sites due to the different circumstances faced by the groups. Thus, the total labour cost is as high as Rs.4.54 per kg of rice.

Table 3.10: Labour Use in Rice Processing by Activity

Activities	Labour Use for 10,002.5 kg of Processed Paddy (md)				Cost for 1 kg Paddy/Rice (Rs)*					
	Family Labour			Hired Labour	COP Family Labour			COP Hired Labour	Total Cost (Rs/kg)	% Cost
	M	F	C	M	M	F	C	M		
Purchasing	6.22	4.72	0.06	0.03	0.22	0.14	-	0	0.36**	7.9
Storage	1.94	0.88	0.06	0.03	0.07	0.03	-		0.10	2.2
Pre-Processing	8.22	20.12	-	-	0.29	0.60	-		0.89	19.6
Boiling	15.72	47.97	0.38	-	0.55	1.44	0.01		2.00	44.0
Milling	9.89	7.60	-	-	0.35	0.23	-		0.57	12.6
Packing	10.70	8.13	-	-	0.38	0.24	-		0.62	13.7
Total	52.73	89.39	0.50	0.06	1.85	2.68	0.01		4.54	100.0

*Wage rate: Rs. 350/= for males and Rs. 300/= for females

** Relevant only for PPPUs

Source: HARTI Field Survey, 2006

3.3.6 Milling and Packing

Modernized mills with de-stoning facilities were not available in each paddy producing village, despite the fact that it was the main criterion in the setting up of the project. Hiripitiyagama was the only project village that had a modern mill, purchased with a loan obtained under the project. At the time of the survey, only 3 villages had mills with de-stoning, de-husking and polishing machines. Of the sample, only 27% had used modernized mills set up for commercial purposes in their own villages and alternative methods were used by 45% of the sample. Entrepreneurs sought to obtain clean paddy which did not require de-stoners; such as paddy threshed on mats and with the technically advanced threshers "Tsunami".

Most of the produce was sold in poly bags with no labels. In Dewahuwa village, the entrepreneurs had made a common label for use at the Galnewa *Pola*. Andarawewa villagers have carried out proper packaging. Only 8% have used a polythene sealer for packaging. High cost of polythene appears a constraint for packaging to which most of the entrepreneurs had not paid attention.

3.3.7 Variation in Cost of Rice Processing

An important factor towards the viability of an enterprise is the cost component. The cost of rice processing was calculated for two distinct units of rice processing, namely **Own Paddy Processing Units (OPPU)** and **Purchased Paddy Processing Units (PPPU)**.

The cost of rice processing has been calculated under three main categories; Transport cost –from purchasing, to milling and sale of rice, Cost of capital items – floor, tanks, barrels, hearth and other, and Operational cost – milling, packing, loan (credit), labour and fire wood.

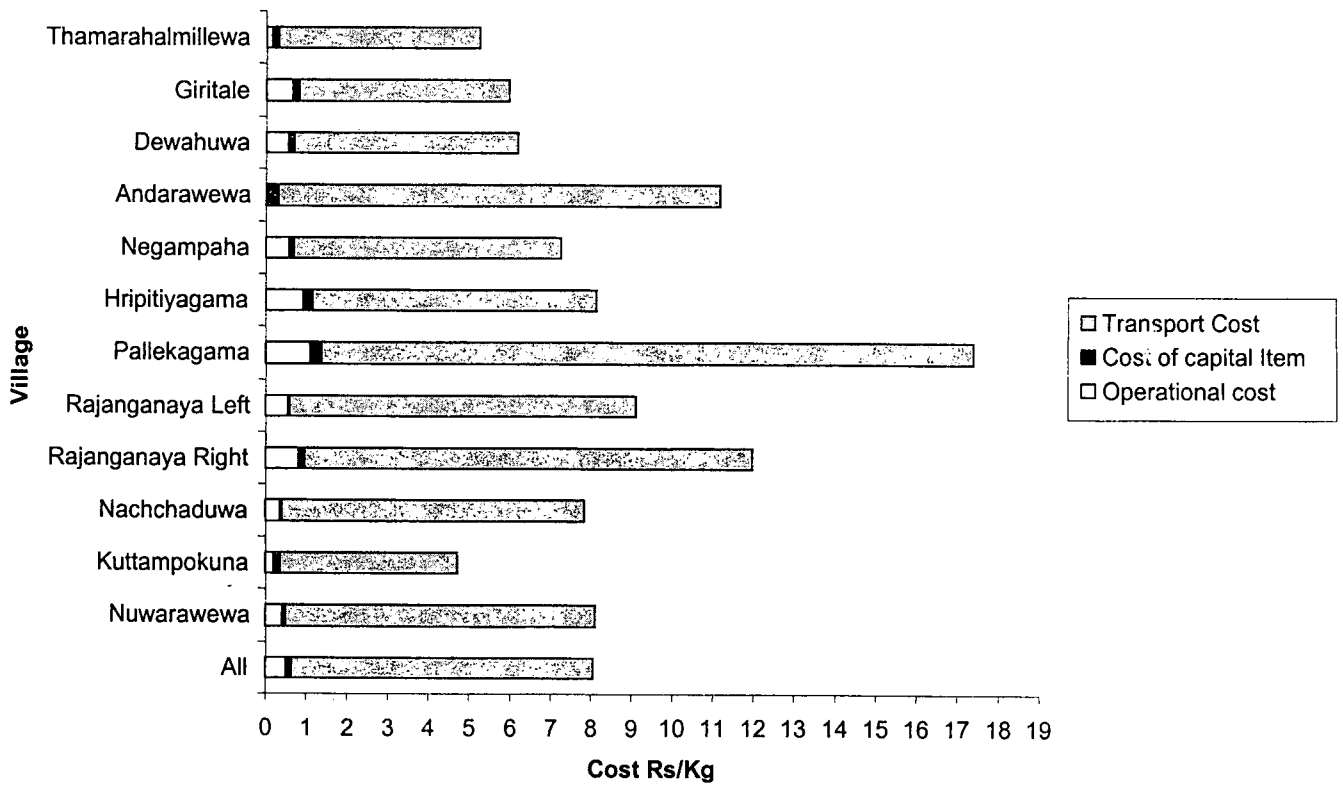
Given below is a description on how these cost items vary on the basis of location specific circumstances.

a. Transport Cost

Included in the cost of transportation is purchasing of paddy for milling and the sale of rice. Two means of transportation concerned are own vehicles and hired vehicles. In this context sometimes the entrepreneurs depend on own labour or hired labour. In general rice producers purchase a large bulk of paddy and store them in the household for future use mainly during the harvesting season when the prices are low, with the resultant increased transportation costs due to the requirement large vehicles. However, the milling and sale of produce are not carried out on such a large scale. There are instances where the producers have used public transport sources as well.

As evident from the figure 3.2, the highest transportation cost of Rs.1.10/kg was observed in Pallekagama, since the village is situated nearly 15-20 km from the town centre. Entrepreneurs buying paddy from places far off from their villages and later taking the produce to the townships contributed to increased transport costs. Since milling includes a part of the transportation cost, the entrepreneurs who used modernized mills outside the villages, had to bear an increase in the transport cost component. Milling outside the village sometimes required the services of the other members of the family and suitable modes of transport. This cost increase holds true for Rajangana Right Bank and Hiripitiyagama villages also. Andarawewa villagers use their own paddy and the village mill is very close to their cluster of houses sparing them of any transport cost.

Figure 3.2: Cost of Rice Processing by Village and Cost Component



Source: HARTI Survey Data, 2006

b. The Operational Cost

The operational cost is calculated along 5 lines. They are labour, milling, packing, loans and fuel wood. There is a variation in labour cost by sex, Rs.350/= for males and Rs.300/= for females. The marked variation of labour cost across villages can be attributed to many factors. The highest labour cost is reported from Pallekagama village because the quantity of paddy soaked was very low (170 kg), resulting in high cost of labour. Rajangana Right Bank is the next highest as they buy paddy from outside, as most of the trainees in this village do not possess any paddy lands. On the other hand, in Kuttampokuna village labour cost is very low (Rs.300/-), since the mill is at a very close proximity to all the entrepreneurs and all those involved in rice processing are females.

The cost of milling is calculated taking into account de-husking, polishing and de-stoning in the milling process. The other operational costs which show a variation is the milling cost from Rs.1.50/kg to Rs.3.00/kg. On an average, the milling cost was Rs.2.00/kg of rice. In areas where there were mills involved in the rice processing village programme, such as Hiripitiyagama and Pallekagama, the mill owners mill paddy for the members of the processing village at a lower rate. Other difficulties faced by the entrepreneurs are the time spent/wasted when mills are not kept open. Also the entrepreneurs had to forgo the husks from the paddy which could otherwise be sold for animal feed.

Cost of fuel wood was an imputed cost. This cost was calculated by way of the number of hours spent in search of fuel wood and the prevailing price in the area. Accordingly, fire wood costing Rs.0.43 is required to process 1 kg of paddy and Rs.15.05 for a barrel of paddy (35 kg). Further, if an entrepreneur processes 4 barrels a day, the cost of firewood amounts to Rs.60/=.

Costs of packaging in most villages were minimal, except in two villages.

c. Cost of Capital Items

The new technology for rice processing at household level requires essential components such as a hearth, barrels to boil paddy, soaking tanks, a drying floor and other equipment such as polythene sheets for drying and wheelbarrows for carrying paddy. The IPHT has estimated a capital cost of Rs. 6.92/day irrespective of the number of barrels of paddy processed per operation (annex table 7). At the operational level, there are many variations in acquiring these components by the entrepreneurs. For the calculation of the capital cost, the life time has been considered as 5 years for sieves, 10 years for soaking tanks, 4 years for paddy boiling barrels, hearth, drying floor and other capital items such as balance, weighing machine, shovel, mats, carpets, water pump and basins.

The cost of each capital item was calculated as in the following example where the cost of drying floor/kg of paddy processed is presented. Accordingly, the cost of drying floor/kg is equal to cost of constructing drying floor divided by the estimated number of kilograms of paddy which could be processed during the said life time.

$$\text{The cost of drying floor} = \frac{\text{Cost of constructing drying floor}}{\text{Extent paddy processed/ Lifetime}}$$

The extent of paddy to be processed during the life time was estimated as follows:

Extent paddy processed (kg/4 years) = No. kg processed in the last operation X No. of operations/month X No. of months in the life time

According to the survey, the cost of constructing a drying floor varies from Rs. 2,250/= to Rs.16,700/= per 100 ft^2, and entrepreneurs assumed that it would last for 4 years. At Andarawewa, since the amount of paddy soaked is of small quantity, the capital cost is high. Lesser the quantity of paddy soaked, the greater the capital cost. The average capital cost amounts to Rs.0.14/kg for both contexts of rice processing.

The data included in the table 3.11 presents the cost of processing paddy under both contexts. Accordingly, the average cost of processing amounts to Rs.8.06/kg and Rs.7.05/kg for PPPUs and OPPUs respectively. From the table, it can be seen that labour is the largest expenditure item in both types and it is the only variable within the operational cost, between the two types of rice processing, which amounts to over 55% of the total cost. The total labour cost of processing of 1kg of paddy in PPPUs is Rs.4.54 and for OPPUs is Rs. 4.18. The next largest item is milling which as a percentage is 25% and 26% for in OPPUs and PPPUs respectively.

Table 3.11: Cost of Paddy Processing by Types of Processing Units

Expenditure Item	Cost at PPPUs (Rs./kg)	Cost at OPPUs (Rs./kg)
Transport Cost at		
Paddy purchase	0.15	-
Milling	0.20	0.20
Sale of rice	0.16	0.16
Sub Total	**0.51 (6.3%)**	**0.36 (4.8%)**
Cost of Capital Items		
Barrel	0.07	0.07
Tank	0.02	0.02
Boil	0.01	0.01
Floor	0.02	0.02
Other	0.02	0.02
Sub Total	**0.14 (1.7%)**	**0.14 (1.8%)**
Operational Cost		
Milling	2.00	2.00
Packing	0.29	0.29
Loan	0.15	0.15
Labour	4.54	4.18
Fire wood	0.43	0.43
Sub Total	**7.41 (91.9%)**	**7.05 (93.3%)**
Cost of processing (including imputed cost of labour and firewood)	8.06	7.55
Cost of processing (excluding imputed cost of labour)	3.52	3.09
Cost of processing (excluding imputed cost of labour and firewood)	3.37	2.94
Cost of paddy/kg	13.41	13.41
Total cost (including imputed cost of labour firewood)	21.47	20.96
Total cost (excluding imputed cost of labour)	16.93	16.78
Total cost (excluding imputed cost of labour firewood)	16.50	16.35

PPPU, N = 24 OPPU, N = 25

Source: HARTI Survey Data, 2006

3.3.8 Marketing of Rice

At the time of this study, 8 months had elapsed since the beginning of the project. The existing marketing channels adopted by the rice producers were studied; four marketing channels were reported of which two are the most popular.

Table 3.12: Rice Marketing Channels

Rice Marketing Channel	No. of Respondents	% of Respondents*
Producers → Consumer	39	60.0
Producer → Retailer → Consumer	22	33.8
Producer → Wholesaler → Retailer → Consumer	3	4.6
Producer → Economic Centre → Consumer	1	1.5
Total	65	99.9

* % has been calculated to the total number of responses (65)

Source: HARTI Survey Data, 2006

It was observed that the majority have used more than one marketing channel to dispose their produce. According to the table 3.12, the majority reported using the direct marketing channel from the producer to the consumers, who form a diverse crowd of villagers, government employees, neighbours and city dwellers. This system worked in Kuttampokuna, Nuwarawewa, Ipologama, Galnewa, Nochchiyagama and Rambewa. It was observed when the producers live in close proximity to the towns, this method of marketing is very popular since the customers who patronize the retailers look for clean (de-stoned) and quality (no odour) rice. Entrepreneurs opined that a larger quantity of rice was sold in villages with no paddy cultivation. The project was implemented both in paddy producing and non producing villages. As seen from the data, a few rice producers have sold their rice through the Economic Centre and through wholesalers.

3.3.9 Women's Participation in Rice Processing Industry

The changed role of women in productive spheres is visible in the rice processing villages. In a bid to improve their living standards, women in many households have turned to income generating activities to supplement the family income. Commencement of the rice processing industry is conditioned by the fact that it can be pursued as a part time activity. Though boiling of paddy and processing is a task to which village women are used to, the training in this new technology given by the IPHT has provided the women with a method to process quality rice which has been fetching a good market price. Most of the women involved in the enterprise have found the required time when children are away at school.

The additional income earned from the enterprise has helped the women to bring about changes in both physical and nutritional standards of the family. Most of the entrepreneurs have attributed this marked improvement to their ability to decide and control the use of this additional income. The workload of the women has necessarily increased with the additional time they have to spend in processing, but they feel that they are amply atoned for, because the cash income they get from the sale of rice is a sufficient incentive. The only disadvantage according to some of the entrepreneurs is the fact that they have to give up their leisure time, mainly during the day, but find that the additional income in hand for food and basic necessities, emergencies and children's education is a sufficient motivation to forgo the leisure time.

CHAPTER FOUR

Viability of Rice Processing amidst Gaps and Constraints at Village Level

4.1 Introduction

As evident from the foregoing discussion, the rice processing industry at the village level was in its second year of operation. While it has been the primary source of income to 45% of the entrepreneurs, it has also contributed to increase the family income especially cash in hand at all times to fulfill the day to day expenses of the household. Six entrepreneurs have given up their previous employment in preference to this enterprise. In addition, both formal and informal savings have gone up, for instance, increase in bank savings, lack of debt during the season and saving through informal methods such as *seettu*.

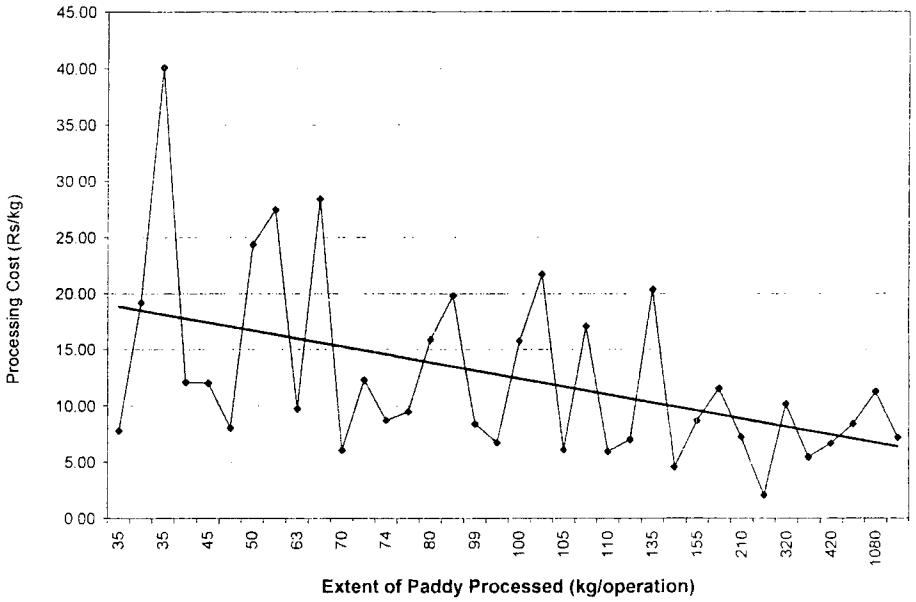
In principle, hardly any enterprise sustains if it is not financially profitable. Further, the technical knowledge and capacity, institutional assistance and market integration are necessary, without which an entrepreneur encounters a series of problems. Rice processors are no exception. This chapter spells out the factors that have contributed to the sustenance of the enterprise at the current level of operation and the gaps and constraints that the entrepreneurs face in trying to build a successful enterprise.

4.2 Financial Profitability of Rice Processing Industry

4.2.1 Profitably versus Scale of Operation

Survey data indicates that there is a marked difference in the number of kilograms of paddy processed amongst the entrepreneurs ranging from 35 kg/operation to 1,504 kg/operation. Figure 4.1 showing the total processing cost/kg indicates a decreasing trend with the increased scale of operation or the quantity of paddy processed per operation. This in turn would relate to more profit with the increasing number of kilograms processed. Therefore for this enterprise to be more profitable, many more kilograms of paddy need to be processed by the entrepreneur.

Figure 4.1: Variation in Processing Cost by Extent of Paddy Processed per Operation



Source: HARTI Survey Data, 2006

4.2.2 Profitability Verses Changing Paddy and Rice Prices

The costs of processing of 1kg of rice for OPPUs and PPPUs at different scenarios are presented in the table 4.1. The 3 scenarios are:

Scenario 1: Including imputed cost of labour and firewood
Scenario 2: Excluding labour and firewood cost
Scenario 3: Excluding labour cost

All the calculations have been carried out based on the average paddy price of Rs. 13.41/kg and average rice price of Rs. 29.01/kg. Accordingly, both processing units do not receive a profit from rice processing if a cost is imputed for labour and firewood (scenario 1). However, it is the other way round if the labour and firewood entail no cost (scenario 2). Thus, it is obvious from the table 4.4 that the profit from rice processing is the value of their labour spent on the enterprise which was unutilized before the commencement of the industry. However, in general the change of paddy and rice prices could impact on the profit of rice processing under different context.

Table 4.1: Profitability against Changing Paddy and Rice Prices under Three Different Scenarios for OPPUs and PPPUs

Expenditure (Rs/kg)	Scenario 1		Scenario 2		Scenario 3	
	PPPU	OPPU	PPPU	OPPU	PPPU	OPPU
Average price of paddy	13.41	13.41	13.41	13.41	13.41	13.41
Processing cost of paddy	8.06	7.91	3.52	3.37	3.09	2.94
Total cost for paddy	21.47	20.96	16.93	16.78	16.50	16.35
Total cost for rice**	30.67	29.94	24.18	23.97	23.57	23.36
Average price of rice	29.01	29.01	29.01	29.01	29.01	29.01
Profit	-1.66	-0.93	4.83	5.04	5.44	5.65

** Paddy to rice conversion ratio 1:7
Source: HARTI Survey Data, 2006

Profit margins which can be achieved by the entrepreneur from PPPU for 3 different scenarios are shown in table 4.2, 4.3 and 4.4. Each table provides the data on the financial profitability of the industry for each combination of paddy and rice prices under consideration and demarcates the threshold level where the entrepreneur is capable of operating the enterprise at no loss or no profit. These tables provide a variety of tradeoffs to the entrepreneur on the scale of operation within the context of available resources. All the calculations in these tables have been performed for 35 kg of paddy which is equal to 1 barrel. The variation in paddy prices was from Rs. 9.00 to Rs. 17.50/kg at the beginning of the sample survey. It was the harvesting season and the prices were low around Rs. 9.00/kg. But with the implementation of the guaranteed purchasing scheme by the government, the paddy price increased to Rs. 17.50/kg. The rice price varied from Rs. 20.00 to Rs. 35.00 per kg. The lowest price reported was at Rajangana Left Bank and the highest at Kuttampokuna and Nuwarawewa.

Table 4.2 presents the rice processing scenario inclusive of the cost of labour and firewood. Accordingly, the average processing cost amounts to Rs. 8.06/kg. The table also identifies a threshold level for each combination of paddy and rice prices. For instance, if the paddy is

purchased at Rs. 9.00/kg the rice should be sold at Rs. 25.00/kg to receive a minimum profit of Rs. 15.40/35 kg of paddy.

Table 4.4 presents the rice processing scenario exclusive of the cost of labour when the profit margin will increase to Rs. 174.30/35 kg (table 4.3) and will further increase up to Rs. 189.35/35 kg (table 4.5) without imputed cost of labour and firewood. This indicates that if an entrepreneur boils one barrel per one operation, the return to his labour amounts to Rs. 174.30. But, what usually happens is an entrepreneur boils 3-4 barrels each time, deploying around 1.8 labour days. Thus, the return to family labour for one operation accounts for Rs. 697.20.

Table 4.2: Relative Profitability of Rice Processing with Own Labour

(Processing 35 kg of Paddy when purchased at Rs. 9.00 to Rs. 17.50 at the average processing cost of Rs. 8.06 and when sold at Rs. 17.00 to Rs. 37.00)

Income (Rs) from Rice Sold at Different Rice Prices (Rs/kg)		Cost for Processing 35 kg of Paddy (Rs) at different Paddy Price (Rs/kg)									
		9.00	**10.00**	**11.00**	**12.00**	**13.00**	**14.00**	**15.00**	**16.00**	**17.00**	**17.50**
		597.1	**632.1**	**667.1**	**702.1**	**737.1**	**772.1**	**807.1**	**842.1**	**877.1**	**894.6**
20	490.0	-107.1	-142.1	-177.1	-212.1	-247.1	-282.1	-317.1	-352.1	-387.1	-404.6
21	514.5	-82.6	-117.6	-152.6	-187.6	-222.6	-257.6	-292.6	-327.6	-362.6	-380.1
22	539.0	-58.1	-93.1	-128.1	-163.1	-198.1	-233.1	-268.1	-303.1	-338.1	-355.6
23	563.5	-33.6	-68.6	-103.6	-138.6	-173.6	-208.6	-243.6	-278.6	-313.6	-331.1
24	588.0	-9.1	-44.1	-79.1	-114.1	-149.1	-184.1	-219.1	-254.1	-289.1	-306.6
25	612.5	**15.4**	-19.6	-54.6	-89.6	-124.6	-159.6	-194.6	-229.6	-264.6	-282.1
26	637.0	39.9	4.9	-30.1	-65.1	-100.1	-135.1	-170.1	-205.1	-240.1	-257.6
27	661.5	64.4	29.4	-5.6	-40.6	-75.6	-110.6	-145.6	-180.6	-215.6	-233.1
28	686.0	88.9	53.9	18.9	-16.1	-51.1	-86.1	-121.1	-156.1	-191.1	-208.6
29	710.5	113.4	78.4	43.4	8.4	-26.6	-61.6	-96.6	-131.6	-166.6	-184.1
30	735.0	137.9	102.9	67.9	32.9	-2.1	-37.1	-72.1	-107.1	-142.1	-159.6
31	759.5	162.4	127.4	92.4	57.4	22.4	-12.6	-47.6	-82.6	-117.6	-135.1
32	784.0	186.9	151.9	116.9	81.9	46.9	11.9	-23.1	-58.1	-93.1	-110.6
33	808.5	211.4	176.4	141.4	106.4	71.4	36.4	1.4	-33.6	-68.6	-86.1
34	833.0	235.9	200.9	165.9	130.9	95.9	60.9	25.9	-9.1	-44.1	-61.6
35	857.5	260.4	225.4	190.4	155.4	120.4	85.4	50.4	15.4	-19.6	-37.1
36	882.0	284.9	249.9	214.9	179.9	144.9	109.9	74.9	39.9	4.9	-12.6
37	906.5	309.4	274.4	239.4	204.4	169.4	134.4	99.4	64.4	29.4	11.9
38	931.0	333.9	298.9	263.9	228.9	193.9	158.9	123.9	88.9	53.9	36.4

Source: HARTI Survey Data, 2006

Table 4.3: Relative Profitability of Rice Processing with Own Labour

(Processing 35 kg of paddy when purchased at Rs. 9.00 to Rs. 17.50 at the average processing cost of Rs. 3.52 and when sold at Rs. 17.00 to Rs. 37.00)

Income (Rs) from Rice Sold at Different Rice Prices (Rs/kg)		Cost for Processing 35Kg of Paddy (Rs) at different Paddy Price (Rs/kg)									
		9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	17.50
		438.2	473.2	508.2	543.2	578.2	613.2	648.2	683.2	718.2	735.7
17	416.5	-21.7	-56.7	-91.7	-126.7	-161.7	-196.7	-231.7	-266.7	-301.7	-319.2
18	441	2.8	-32.2	-67.2	-102.2	-137.2	-172.2	-207.2	-242.2	-277.2	-294.7
19	465.5	27.3	-7.7	-42.7	-77.7	-112.7	-147.7	-182.7	-217.7	-252.7	-270.2
20	490.0	51.8	16.8	-18.2	-53.2	-88.2	-123.2	-158.2	-193.2	-228.2	-245.7
21	514.5	76.3	41.3	6.3	-28.7	-63.7	-98.7	-133.7	-168.7	-203.7	-221.2
22	539.0	100.8	65.8	30.8	-4.2	-39.2	-74.2	-109.2	-144.2	-179.2	-196.7
23	563.5	125.3	90.3	55.3	20.3	-14.7	-49.7	-84.7	-119.7	-154.7	-172.2
24	588.0	149.8	114.8	79.8	44.8	9.8	-25.2	-60.2	-95.2	-130.2	-147.7
25	612.5	174.3	139.3	104.3	69.3	34.3	-0.7	-35.7	-70.7	-105.7	-123.2
26	637.0	198.8	163.8	128.8	93.8	58.8	23.8	-11.2	-46.2	-81.2	-98.7
27	661.5	223.3	188.3	153.3	118.3	83.3	48.3	13.3	-21.7	-56.7	-74.2
28	686.0	247.8	212.8	177.8	142.8	107.8	72.8	37.8	2.8	-32.2	-49.7
29	710.5	272.3	237.3	202.3	167.3	132.3	97.3	62.3	27.3	-7.7	-25.2
30	735.0	296.8	261.8	226.8	191.8	156.8	121.8	86.8	51.8	16.8	-0.7
31	759.5	321.3	286.3	251.3	216.3	181.3	146.3	111.3	76.3	41.3	23.8
32	784.0	345.8	310.8	275.8	240.8	205.8	170.8	135.8	100.8	65.8	48.3
33	808.5	370.3	335.3	300.3	265.3	230.3	195.3	160.3	125.3	90.3	72.8
34	833.0	394.8	359.8	324.8	289.8	254.8	219.8	184.8	149.8	114.8	97.3
35	857.5	419.3	384.3	349.3	314.3	279.3	244.3	209.3	174.3	139.3	121.8
36	882.0	443.8	408.8	373.8	338.8	303.8	268.8	233.8	198.8	163.8	146.3
37	906.5	468.3	433.3	398.3	363.3	328.3	293.3	258.3	223.3	188.3	170.8

Source: HARTI Survey Data, 2006

Table 4.4: Relative Profitability of Rice Processing with Own Labour and Firewood

(Processing 35 kg of paddy when purchased at Rs. 9.00 to Rs. 17.50 at the average processing cost of Rs. 3.09 and when sold at Rs. 17.00 to Rs. 37.00)

Income (Rs) from Rice Sold at Different Rice Prices (Rs/kg)		Cost of Processing 35 kg of paddy (Rs) at different paddy price (Rs/kg)									
		9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	17.50
		423.15	458.15	493.15	528.15	563.15	598.15	633.15	668.15	703.15	720.65
17	416.5	-6.65	-41.65	-76.65	-111.65	-146.65	-181.65	-216.65	-251.65	-286.65	-304.15
18	441		-17.15	-52.15	-87.15	-122.15	-157.15	-192.15	-227.15	-262.15	-279.65
19	465.5	42.35	7.35	-27.65	-62.65	-97.65	-132.65	-167.65	-202.65	-237.65	-255.15
20	490.0	66.85	31.85	-3.15	-38.15	-73.15	-108.15	-143.15	-178.15	-213.15	-230.65
21	514.5	91.35	56.35	21.35	-13.65	-48.65	-83.65	-118.65	-153.65	-188.65	-206.15
22	539.0	115.85	80.85	45.85	10.85	-24.15	-59.15	-94.15	-129.15	-164.15	-181.65
23	563.5	140.35	105.35	70.35	35.35	0.35	-34.65	-69.65	-104.65	-139.65	-157.15
24	588.0	164.85	129.85	94.85	59.85	24.85	-10.15	-45.15	-80.15	-115.15	-132.65
25	612.5	189.35	154.35	119.35	84.35	49.35	14.35	-20.65	-55.65	-90.65	-108.15
26	637.0	213.85	178.85	143.85	108.85	73.85	38.85	3.85	-31.15	-66.15	-83.65
27	661.5	238.35	203.35	168.35	133.35	98.35	63.35	28.35	-6.65	-41.65	-59.15
28	686.0	262.85	227.85	192.85	157.85	122.85	87.85	52.85	17.85	-17.15	-34.65
29	710.5	287.35	252.35	217.35	182.35	147.35	112.35	77.35	42.35	7.35	-10.15
30	735.0	311.85	276.85	241.85	206.85	171.85	136.85	101.85	66.85	31.85	14.35
31	759.5	336.35	301.35	266.35	231.35	196.35	161.35	126.35	91.35	56.35	38.85
32	784.0	360.85	325.85	290.85	255.85	220.85	185.85	150.85	115.85	80.85	63.35
33	808.5	385.35	350.35	315.35	280.35	245.35	210.35	175.35	140.35	105.35	87.85
34	833.0	409.85	374.85	339.85	304.85	269.85	234.85	199.85	164.85	129.85	112.35
35	857.5	434.35	399.35	364.35	329.35	294.35	259.35	224.35	189.35	154.35	136.85
36	882.0	458.85	423.85	388.85	353.85	318.85	283.85	248.85	213.85	178.85	161.35
37	906.5	483.35	448.35	413.35	378.35	343.35	308.35	273.35	238.35	203.35	185.85

Source: HARTI Survey Data, 2006

4.3 Other Contributing Factors for Viability

Financial profitability alone is not the sole criterion for an industry to be viable. The survey bears testimony to prove that the rice processing is sustained where other needy components exist as given below.

4.3.1 Motivation and Commitment

Micro-entrepreneurs would sometimes give up their enterprise if they failed to get a lending hand/assistance from officials. Diverse means of motivation thus contribute towards the continuation of such enterprises. The ARPA in Nuwarawewa was actively involved with the group and has been a continuous help to the group. It is under her direction that the group obtained certain facilities such as a sealer for packaging the processed rice. The strong commitment of the group has made the enterprise a remarkable success.

4.3.2 Availability of Inputs

Paddy, labour, firewood and water are the key resources required to run the enterprise. It was seen that only the entrepreneurs who have sufficient paddy at home either from their own fields or have the cash to purchase the paddy were able to continue the business on an uninterrupted basis. Further, the financial viability of the enterprise was largely determined by the availability of family labour and firewood. Water was also crucial as it is a water demanding enterprise.

4.3.3 Credit and Group Strength

On time availability of credit at reasonable interest rates was an essential requirement for this industry which demands a high initial capital cost and purchase of paddy on time. The group strength has also been supportive for the entrepreneurs to sustain the enterprise.

4.3.4 Quality of the Value Added Products

Quality is another vital factor for the success of the enterprise. Technical knowledge of the entrepreneurs on the new technology and how they use it for the processing of rice largely determine the quality of the produce, the key factor that creates a good demand other than the price. The availability of essential equipment and infrastructure ensures the correct application of the technology as evident from the survey.

4.3.5 Proper Market Places and Right Prices

This is proven through the following successful examples:

a. Marketing did not prove to be difficult to most of the entrepreneurs in Hiripitiyagama as the traders who were interested in purchasing paddy came to the village. The sales centre was by the side of the main road and the clients were government officials, neighbours and motorists traveling through the village.
b. The Negampaha group had an arrangement to supply the processed paddy to a mill owner at an additional cost. The arrangement was more efficient and convenient.
c. The only entrepreneur in Nachchaduwa had his own paddy and had built marketing links within the community.
d. An entrepreneur in Pallekagama had his own retail shop and sold the produce to the neighbours.

4.4 Gaps and Constraints in Rice Processing Industry

4.4.1 Training Gaps

Fifteen percent of the trainees reported that a further training would be helpful to remedy the lapses in the initial training programme. It appears that training needs vary according to the difficulties experienced through the involvement of rice processing industry as given below:

a. Several entrepreneurs (Andarawewa) complained of the inability to store boiled paddy for longer periods. This had affected their sales since the boiled paddy had to be milled within a few days. This factor in addition to being time consuming had affected their day-to-day activities and income.
   Training Need: Technology for storing boiled paddy, which could then be used for a continuous milling throughout the year.
b. Certain respondents experienced continuous discolouring of the rice which they attributed to an erroneous method used by them in the processing of the paddy which had affected their prospects of marketing quality rice.
   Training Need: Practical training from the point of boiling paddy to drying and to processing/milling so the standard of high quality of processed rice is achieved.
c. A few of the entrepreneurs from Negampaha and Thamarahalmillewa complained of marketing and financial management problems.
   Training Need: Better and more attractive packaging methods to meet the requirements of the supermarket buyers. Financial management to develop the business to a profit making enterprise.
d. The IPHT is the single institution equipped with the capacity to provide the technical know-how, supervise and monitor the progress of the technical aspects of the project. One of the problems of the institute was the lack of officials/researchers; there were only 4 researchers whose expertise could be utilized for the dissemination of the technology. This factor hindered the follow up training to entrepreneurs when they deemed it necessary thus affecting the marketability of their rice and resulting in complaints by the entrepreneurs.

4.4.2 Credit and Institutional Problems

For the enterprise to be economically viable, a continuous operation is required which in turn needs a paddy stock at all times within the household. An initial loan was given to each of the entrepreneurs to initiate the enterprise. The following drawbacks were identified in the area of credit use and other institutional involvements.

a. **Misuse of credit:** The loan given was utilized by some of the entrepreneurs for other purposes. In Andarawewa only 4 had utilized the loan to construct threshing floors, others had used mats for drying of paddy and rice which affected the quality of processed rice. This has had a negative effect on the development of the rice processing industry.
b. **Unavailability on time:** To purchase the paddy, entrepreneurs required cash at the time of harvest when paddy prices were at their lowest. The only source of cash for them was credit from the banks or the money lenders. In the absence of cash at the time of harvesting to purchase paddy from other sources, they used for processing their own paddy kept aside for household consumption. Entrepreneurs had two options, either to utilize the processed rice for consumption or buy paddy from the market. Most entrepreneurs preferred to sell their processed rice. At Andarawewa, the initial loan given was not obtained on time prompting the entrepreneurs to sell their paddy to re-pay loans, which in turn affected their profit. At Thamarahalmillewa, the paddy cultivation was only in *maha* season under rain-fed conditions and if they were in pursuing the enterprise, they had to purchase paddy for which they required credit, they found difficulties in obtaining credit individually.
c. **Problems of guarantees:** Entrepreneurs found it difficult to obtain loans when some members in a group, had defaulted payments of their initial loans. The credit scheme was negotiated by the IPHT, and the entrepreneurs found it difficult to obtain any further credit without institutional support.

d. **Delay in re-payment of credit:** Thamarahalmillewa and Dewahuwa rice processing groups quoted circumstances such as marketing problems and lack of paddy to continue with the enterprise, as reasons for the poor re-payment capacity.

4.4.3 Limitations in Acquiring Equipment and Infrastructure

a. **Financial shortage:** As previously discussed, the entrepreneurs run their enterprise with a shortage of many equipment largely due to financial difficulties. This situation has raised a variety of quality issues, for instance, the group in Kuttampokuna had encountered hindrances in the production of 'A' grade rice. Their main problem was the lack of adequate storage facilities. The monopoly of large mill owners through which a large stock of paddy were stored during the harvesting season has affected the entrepreneurs who do not have access to a large quantity of paddy in the latter part of the season.
b. **Inadequate milling facility:** Though the majority of the entrepreneurs (55%) used modernized mills in their own villages, most of these mills were not under the purview of the project, but set up for commercial purposes in the area. Alternative methods were used for milling by the rest (45%) of the sample due to lack of access to a modernized mill with a de-stoner in the villages such as Negampaha and Thamarahalmillewa. Though the village mill in Hiripitiyagama was fitted with a de-stoner, all the members could not obtain the services of the mill, since some of the members were a distance away from the mill location. The operation of the mill at Andarawewa village ceased after the first season and the group faced problems in milling. Reaching the mill far off from the village involves a higher cost. Nachchaduwa village has a mill with a de-stoner but the entrepreneurs found it difficult to deal with the mill owner who was not responsive to their requests, which in turn led to delays in milling, causing problems for the entrepreneurs to sell their products. Lack of their own mill in the village for the Girithale group constrained them from milling of paddy whenever they required.

4.4.4 Rice Marketing Issues

Marketing of the value added high quality rice requires a permanent arrangement as envisaged in the original concept of the project. It was found that no proper marketing arrangement has been organized as proposed by the IPHT leaving the marketing potential not fully exploited. Hence, the rice producers adopted their own marketing strategies encountering a multitude of problems both general and location specific as summarized below.

General Rice Marketing Problems:

a. **Influence of wholesale rice traders on the rice prices:** Wholesalers influence the small scale rice producers through distributing low quality rice at lower prices to the market. A price decline in the open market causes a drop in the profit margin of the small rice producers.

Location Specific Problems:

a. **Unavailability of a proper market place:** This has resulted in dependency on limited customers from the neighbouring vicinity. This was reported from Galnewa, Nachchaduwa, Giribawa, Nochchiyagama and Rambewa villages.
b. **High transportation cost incurred:** This problem was recorded at Giribawa, Dewahuwa, Andarawewa and Pallekagama rice processing villages. The group at Dewahuwa had sought permission from the Pradeshiya Sabha to sell their rice at the *Pola* (village fair). But, they ran into difficulties and finally gave up the scheme after incurring expenses in the transport of produce on two days to the *Pola*.

c. **Limited demand for quality rice in major paddy producing areas:** In general, the traditionally milled rice can be sold at a lower price than the rice processed with the use of new technology. Thus, the people in rural areas prefer to buy the affordable low priced rice. Therefore, the demand for value added quality rice from the people is limited at the rice processing areas. Further, in processing areas, most of the consumers are producers who have their own rice for consumption. This was reported at Dewahuwa, Diyabeduma and Rajangana. Marketing of the produce at Thamarahalmillewa was mainly to the neighbours and the friends in the village, and the limited demand was not favourable to make the enterprise a long term viable project. Most of the buyers mainly bought this rice in small quantities and large purchases were only during special festive occasions.

d. **Inability to ensue un-interrupted supply:** In Negampaha, the group had ventured to look for new areas of marketing such as the Cargills Supermarket chain but they required 500 kg/month which the group was unable to fulfill specially during the rainy season, in the absence of a suitable place to dry the boiled paddy. This has also resulted in a breakdown in the supply. Dewahuwa entrepreneurs also signed a marketing agreement with the co-operative but they could not continue the supply during the rainy season. They too failed to supply continuously the needs of the Cargills Supermarket chain.

e. **Delay in realizing cash:** This largely happens when the sale is through retailers on credit and they pay the producers when the supply is over, affecting the cash flow of the entrepreneurs; for instance, Girithale.

Given the circumstances, the majority of entrepreneurs (53.1%) claim that any increase in production should be coupled with better marketing arrangements.

4.4.5 High Cost of Processing

As previously discussed, high initial capital cost, increasing paddy prices and changing operational cost because of location specific circumstances contributed to the increased cost of rice processing.

4.4.6 Group Weaknesses

The group strength was a vital factor for the success of the enterprise. However, as evident from the table 4.6, the decreased membership due to a variety of factors which are location specific to a certain extent has eroded the group strength. At the time of the survey, all entrepreneurs in Rajangana Right Bank who were initially involved in the project had stopped all the activities in the face of a multitude of problems. The main factor was the persons trained did not own any paddy lands and therefore did not have any paddy to process, or money to buy paddy during the harvesting time. Also, there was no modernized mill in the village. At Negampaha, transportation for milling and selling plus the lack of paddy or rather the lack of ready cash to buy paddy when required have been problems. The interest in the enterprise in Hiripitiyagama group diminished since it proved to be time consuming for most of the entrepreneurs.

Table: 4.5: Changing Group Membership over the Time

Village	Initial Membership	Active Membership by Early 2006
Nuwarawewa	19	9
Negampaha	16	12
Hiripitiyagama	20	19
Andarawewa	14	11
Kuttampokuna	14	09
Nachchaduwa	21	12
Pallekagama	09	04
Girithale	10	10
Devahuwa	22	14
Rajangana Right Bank	16	10
Rajangana Left Bank	15	06
Thamarahalmillewa	10	06

Source: Survey Data, 2006

4.5 National Significance of Rice Processing Village Concept

The RPV concept was envisaged to find solutions to the paddy sector problems through creating regionalized domestic rice markets. The following is a brief inquiry into the success of the RPV programme in terms of achieving the set targets.

4.5.1 As a solution to the Paddy Marketing Problem

At micro level, it is solution to a certain extent, because the entrepreneurs have used their own paddy ranging from 10% to 100% for rice processing with an average of 52% of their total produce in the previous season (annex figure 1). Further, on an average, they have sold 37% of the paddy produced due to the limited scale of operation, for many reasons, and for urgent financial needs. At the same time, 24 entrepreneurs have purchased some 9,350 kg of paddy to be used for processing. Therefore, the rice processing industry has contributed to solve the paddy marketing problem at rural level though on a limited scale.

4.5.2 As an Appropriate Self Employment especially for Women

This is also true to a certain extent. The use of female labour is higher and the gendered division of labour is prominent throughout the process. Hence, in a society where such a division is prevalent and till these constraints are eliminated through appropriate mechanisms, this objective will not be a total reality. To date, rice processing signifies a family enterprise which can hardly be sustained in the absence of male labour component for male dominated activities such as milling and transportation of inputs and outputs. Nevertheless it has been an appropriate income generating opportunity largely for the rural households with abundant labour. The all women group at Kuttampokuna is a successful example. Though they run the enterprise at a shortage of equipment what was produced by this group was better than traditionally milled rice. Their membership is also increasing.

4.5.3 As a Means of Producing Good Quality Rice at an Affordable Price to the Consumers

This has been entirely successful, because the new technology has proven the ability for producing high quality rice at a reasonable cost.

4.5.4 Overall, as a Strategy for Creating Regionalized Rice Markets

Creation of regionalized markets has been highly insignificant. In the presence of a multitude of constraints that hamper the whole process from paddy purchasing through production of quality rice to marketing, the RPV concept has failed to create niche markets for the value added products.

CHAPTER FIVE

Summary, Conclusions and Recommendations

Summary

As envisaged in the "Mahinda Chinthana" development proposals, one among many of the strategies to overcome the key issues in the paddy sector is to create regionalized domestic rice markets through Rice Processing Village (RPV) programme. The introduction of a processing system to produce superior quality rice at household level through which returns to the paddy farmer can be increased as well as employment opportunities can be created especially for women. The RPV programme along with a package of interventions commenced operations in July 2005 at Hiripitiyagama in the Ipalogama Divisional Secretariat and extended to other villages in the Anuradhapura and Polonnaruwa districts.

This study was aimed at evaluating the pilot project for the RPV concept to ascertain the problems and constraints, the farmers countenanced to determine the viability of the concept along with its major technological interventions for extension potential rice producing areas.

At the village level, the programme has been executed with the key components for group formation and capacity building on the new technological aspects, institutional support for financial needs and setting up of modern mills for the processing of quality rice. The Institute of Post Harvest Technology was involved in the capacity building of the new technology and low interest rates, lack of guarantees, and short term conditions which were characteristic to the credit system.

The sample survey which carried out based on 40% of the rice processors to analyze the cost effectiveness of the new technology and the status of its adoption reveals that rice processors are of two main types; own paddy processors and purchased paddy processors. Some salient features of the sample are; 73% consists of women entrepreneurs, majority educated at secondary level with a family size of 4-5 members, rice processing being the main employment of the majority of men and secondary employment of the majority of women. In general, the sample farmers were facing problems of price decline during the harvesting period.

According to the analysis, rice processing is largely a labour intensive activity where the family labour comprises virtually the entire labour component of which 60% are female family labour. The process consists of a number of labour intensive activities; purchasing of paddy and transportation, storage, sieving, cleaning, washing, soaking, boiling, sun drying, milling, packing and selling. The variation of cost of processing between the entrepreneurs is attributed to variation between the main cost components; transportation, capital items and operational cost.

On an average, the cost of rice processing between two contexts of processing, purchased paddy and owned paddy, amounts to Rs. 7.41/kg and Rs. 7.05/kg respectively. The increase in the former is due to additional transportation and labour costs for purchasing of paddy. Analysis reveals that the financial profitability of rice processing industry depends on the scale of operation, the prices of paddy, and rice. It shows that larger the scale of operation, lower the paddy prices and higher the prices of processed rice the higher the profitability. Further, under the general status of operation where an entrepreneur boils 3-4 barrels each time deploying 1.8 labour days, the return to family labour accounts for Rs. 697.20/day. The sustenance of the enterprise is determined by motivation by the officials, availability of paddy

and labour, credit facilities and group strength, quality of processed rice and proper market places and right prices.

A variety of gaps and constraints have had an impact on the RPV programme. Gaps in technical know-how on the processing of quality products, an array of institutional problems from supply of credit to repayment, limitations in acquiring essential equipment and infrastructure, rice marketing problems, high cost of processing and group weaknesses appear as the sustainable issues of the concept.

Thus, the RPV concept has failed to create niche markets for the value added rice in the presence of a multitude of constraints. Further, it has demonstrated a limited capacity to solve the paddy marketing problem at rural level. Gendered division of labour throughout the process has given significance to the industry as a family enterprise which can hardly be sustained only with the female labour component of the family. However, the proven ability of the new technology to produce high quality rice at a reasonable cost that benefits both processors and the consumers carries the most vital share for the sustenance of the industry at rural level. Hence, the replication of the RPV concept devoid of the above gaps and constraints has the potential for creating regionalized domestic rice markets at village level as envisaged by the "Mahinda Chinthana" development plans.

Conclusions

1) The Rice Processing Village (RPV) concept with the objective of creating a "regionalized domestic rice markets" is an appropriate strategy for solving a number of issues in the paddy production and marketing sector in Sri Lanka.

2) The RPV concept stepped into the village as an 'Integrated Approach' or an 'Intervention Package' which comprises (a) high quality rice processing technology that seeks to overcome the drawbacks of conventional rice processing methods (b) appropriate machinery for the same (c) financial assistance through small groups and (d) training on innovative marketing methods to face the challenges of marketing.

3) However, evidence is available to show that most of the above components are subject to enormous challenges at the grass root level/in practice.
    a) The profit margin from the rice processing at household level is largely dependent on the use of family labour throughout the process.
    b) Another key determinant of profit from the industry is frequently fluctuating price of paddy. One of the solutions to this problem is to use paddy produced by the entrepreneur. Storing of paddy during harvesting season is another alternative but it is constrained by financial and storage difficulties.
    c) In addition to this, de-stoners which are essential for producing good quality rice are not yet established in some villages, adversely affecting the quality of rice.
    d) Ultimately entrepreneurs are left with no proper market facilities.

4) However, the majority of rice processors are in the industry at a subsistence level due to all these constraints which impede them to achieve the desired advantages of economics of scale in the industry.

5) Nevertheless, there is evidence to show that all these constraints spatially vary. Further, one successful entrepreneur claimed that all these constraints could be surmounted.

6) Apart from that, RPV concept assumes higher significance as an agro-based industry that is capable of mainstreaming the idle family labour, in particular female family labour, into rural economy in an appropriate manner.

7) Therefore it is strongly recommended that RPV concept should be replicated/extended into other potential areas with appropriate alternatives for effectively solving the problems that would arise in the four fold areas of technical know-how, financial facilities, essential machinery and marketing as recommended below.

Recommendations

1. This technology should be disseminated to the other parts of the country, as it is a viable enterprise at household level and it serves the dual purpose of employment creation and providing a valuable source of income for both the underemployed and the unemployed. The present IPHT staff strength is hardly sufficient to achieve this end and therefore an adequate cadre versed in the new technology has to be made available as an initial step.
2. A revolving fund, an indispensable condition to give credit to the entrepreneurs for purchase of paddy either during the harvesting season or mid season, could either be set up within the rice processing group or credit made available by the bank.
3. One of the main components required for the processed quality rice is de-stoning of the rice for which village mills should be provided with de-stoners. This will give the opportunity for the entrepreneurs to label their products as de-stoned rice, and sell the product at a higher price. A credit line has to be initiated by the banks to provide loans to the mill owners at interest rates lower than the current bank rules for the purchase of machinery and equipment.
4. A strong propaganda campaign needs to be carried out by either the IPHT or the Ministry of Agriculture to popularize the quality rice produced through this method of processing.
5. Marketing ability of entrepreneurs should be increased through an orientation in marketing so that they can face the competition in the open market. Ability to deal with larger complexes e.g. Cargills and Keels to market their produce.

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ANNEXURES

Annex Table 2.1: Paddy Production (000'MT) by Season and by District 2000-2006

Year	2001			2002			2003		
	Maha	*Yala*	Total	*Maha*	*Yala*	Total	*Maha*	*Yala*	Total
Anuradhapura	146	62	208.0	164.0	40.0	204.0	219.0	67.8	286.8
Polonnaruwa	213	207	420.0	198.0	174.0	372.0	197.0	184.4	381.4
Sri Lanka	1,614	1,083	2,696.9	1,774.5	1,089.1	2,863.7	1,898.8	1,172.2	3,069.0
	2004			2005			2006		
	Maha	*Yala*	Total	*Maha*	*Yala*	Total	*Maha*	*Yala*	Total
Anuradhapura	101.8	9.9	111.7	223.2	82.5	305.6	224.3	77.3	301.5
Polonnaruwa	227.7	167.0	394.7	230.6	209.8	440.5	228.8	210.2	439.0
Sri Lanka	1,669.7	958.2	2,627.8	2,012.7	1,233.5	3,246.2	2,135.6	1,206.3	3,341.9

Source: Department of Census and Statistics, 2006

Annex Table 2.2: Monthly Average Prices and Index Value of Paddy (Samba) in Anuradhapura (Rs/kg)

Month	2002	2003	2004	2005	2006	Average	Index Value
January	16.20	19.56	14.88	21.50	16.27	17.68	115.75
February	15.59	15.92	14.91	16.08	13.89	15.28	100.01
March	14.99	12.88	15.03	14.84	12.63	14.07	92.12
April	14.17	12.17	15.69	14.63	12.39	13.81	90.38
May	14.31	12.38	16.00	14.33	11.65	13.73	89.90
June	14.85	12.90	16.81	14.29	12.79	14.33	93.79
July	14.88	11.88	17.50	13.56	13.20	14.20	92.98
August	15.35	11.79	18.60	13.91	13.24	14.58	95.43
September	16.35	12.42	21.25	17.63	15.17	16.56	108.42
October	17.60	12.94	20.25	17.77	15.46	16.80	110.00
November	19.25	14.73	Na	18.37	15.61	16.99	111.21
December	20.15	15.50	Na	18.08	15.84	17.39	113.86
Average	15.77	13.60	17.09	16.08	13.84	15.28	100.00

Source: Food Information Bulletin 2002-2006, HARTI

Annex Table 2.3: Monthly Average Prices and Index Value of Paddy (Nadu) in Anuradhapura (Rs/kg)

Month	2002	2003	2004	2005	2006	Average	Index Value
January	15.55	13.63	15.54	16.96	12.87	14.91	112.89
February	14.56	11.50	15.44	12.44	11.42	13.07	98.98
March	13.56	11.55	14.23	12.75	10.81	12.58	95.25
April	13.08	11.08	14.63	13.25	11.05	12.62	95.55
May	13.25	11.35	14.75	12.58	11.06	12.60	95.39
June	13.28	12.58	14.94	12.29	11.98	13.01	98.53
July	12.60	11.50	16.63	11.56	12.47	12.95	98.06
August	12.75	10.79	17.48	11.43	12.46	12.98	98.29
September	11.85	11.38	17.94	12.13	13.29	13.32	100.83
October	12.91	11.88	17.00	12.31	13.21	13.46	101.94
November	13.58	13.75	Na	14.08	13.68	13.77	104.28
December	14.35	15.00	Na	14.38	14.71	14.61	110.62
Average	13.36	11.91	15.86	12.89	12.21	13.21	100.00

Source: Food Information Bulletin 2002-2006, HARTI
Na – Not available

Annex Table 2.4: Monthly Average Prices and Index Value of Rice (Samba) in Anuradhapura (Rs/kg)

Month	2002	2003	2004	2005	2006	Average	Index value
January	32.80	43.56	31.90	46.20	41.32	39.16	110.93
February	Na	42.60	31.85	42.80	36.93	38.55	109.20
March	Na	32.33	31.16	35.80	35.53	33.71	95.49
April	Na	28.25	Na	35.00	35.60	32.95	93.35
May	Na	28.25	35.65	34.80	33.44	33.04	93.59
June	Na	Na	35.30	34.20	32.47	33.99	96.29
July	Na	29.25	37.03	33.95	32.28	33.13	93.85
August	33.75	28.25	37.34	33.10	32.90	33.07	93.68
September	34.50	27.50	41.90	37.45	33.15	34.90	98.87
October	36.47	28.83	Na	39.35	35.48	35.03	99.24
November	38.43	30.15	Na	40.05	39.00	36.91	104.56
December	41.08	32.28	Na	43.47	39.85	39.17	110.97
Average	36.17	31.93	35.27	38.01	35.66	35.30	100.00

Source: Food Information Bulletin 2002-2006, HARTI
Na – Not available

Annex Table 2.5: Monthly Average Prices and Index Value of Rice (Nadu) in Anuradhapura (Rs/kg)

Month	2002	2003	2004	2005	2006	Average	Index value
January	28.30	28.81	30.40	36.27	30.88	30.93	109.06
February		26.31	31.45	32.00	27.13	29.22	103.03
March		24.33	29.68	28.20	25.73	26.99	95.14
April		23.50		27.40	26.60	25.83	91.08
May		23.38	31.88	26.00	26.76	27.01	95.22
June			31.32	26.10	26.87	28.10	99.06
July		26.25	32.25	25.65	28.24	28.10	99.07
August	27.25	24.75	32.36	24.55	28.35	27.45	96.79
September	26.33	23.50	34.27	27.05	28.35	27.90	98.37
October	26.63	25.35	35.20	27.65	28.76	28.72	101.26
November	27.63	27.20	-	29.25	30.93	28.75	101.38
December	28.92	30.10	-	33.33	33.05	31.35	110.54
Average	27.51	25.77	32.09	28.54	28.47	28.36	100.00

Source: Food Information Bulletin, 2002-2006, HARTI

Annex Table 2.6: Standards for Paddy and Rice in Sri Lanka

Elements of Quality Control	Paddy[1]				Raw Rice[2]				Parboiled Rice[2]			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Moisture*	14.0	14.0	14.5	15.0	14.0	14.0	14.0	14.0	14.0	14.0	15.0	15.0
Foreign matter*	0.5	1.0	1.0	2.0	-	0.3	0.5	1.0	-	0.3	0.5	1.0
Type admixture*	1.0	3.0	7.0	10.0	-	2.0	6.0	10.0	-	2.0	6.0	10.0
Damaged grain	0.5	2.0	5.0	7.0		1.0	2.0	4.0	0.5	2.0	4.0	5.0
Immatured grain*	0.5	2.0	3.0	4.5	-	-	-	-	-	-	-	-
Broken grain*	-	-	-	-	8.0	20.0	30.0	45.0	1.0	5.0	15.0	20.0
Paddy seeds (grains per kg)	-	-	-	-	-	5.0	15.0	30.0	-	5.0	15.0	30.0

[1] Sri Lanka Standard 632:1984

[2] Sri Lanka Standard 633:1995

* Unit: percent by mass. Max.

Source: Sri Lanka Standard Institute, 2003

Annex Table 2.7: Particulars of Rice Processing Villages

District	DS Division	ASC	Village	Name of Group	Year of Commencement
Anuradhapura	Nuwaragampalatha	Gammiriswewa	Nuwarawewa, Jayanthigama	Parakrama	April, 2005
Anuradhapura	Galnewa	Negampaha	Negampaha, Kadulugama	Sikura	March, 2005
Anuradhapura	Ipalogama	Ipalogama	Hiripitiyagama	Samagi	May, 2005
Anuradhapura	Nochchiyagama	Nochchiyagama	Andarawewa	Mahasen	May, 2005
Anuradhapura	Nuwaragampalatha	Elayapattuwa	Kuttampokuna	Prathiba	October, 2005
Anuradhapura	Nachchaduwa	Nelumbima and Savathipura	Diwulwewa/ Nachchaduwa	Ekamuthu	May, 2005
Anuradhapura	Ipalogama	Ipalogama	Pallekagama	Ran Daha Biddi	May, 2005
Polonnaruwa	Hingurukagoda	Giritale	Giritale Janapadaya	Janani	May, 2005
Kurunegala	Galewela	Dewahuwa	Watagala/ Budugehinna	Pragathi	May, 2005
Anuradhapura	Rajangana Right Bank	Rajangane Yaya 1	Rajangane Right	Prabeda	June, 2005
Anuradhapura	Giribawa	Rajangana Left Yaya 3	Rajangana Left	Suriya	August, 2005
Anuradhapura	Ranbewa	Kallanchiya	Thamaramilhawa	Thabarawila	May, 2005

Source: HARTI, Survey Data, 2006

Annex Figure 4.1: Entrepreneurs who utilized Own Paddy for Processing of Rice