

**Product Mix and Sales Maximization of Rice Mill Entrepreneurs in Ampara Coastal Area,  
Eastern Province of Sri Lanka**

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**Abstract**

*This paper aims at knowing different types of brands sold by rice mill owners; finding out mode of packaging and identifying way of quality maintenance. Exploratory and conclusive research is designed by the researcher. Target population: Primary Sampling Units (PSU) are all the research sites. i.e. the small and medium rice mills located in Ampara Coastal area. Secondary Sampling Units (PSU) are all the respondents i.e. mill owners who own small and medium rice mills in this area. Sample size of the PSU is selected by using cumulative total method. SSU is selected from the selected PSUs. Of the 182 rice mills, researcher has selected 88 rice mills as PSU. Brands sold by rice mill owners are White Long, Short White, Red Samba, Red Bolai (Autocaran), White Samba, Keeri Samba, AT Red, and Baasmadi. Rice mill owners use white, light yellow and light green bags for packaging their rice. Rice mill owners maintain via sand free rice, stone free rice and black free rice by respective machines. Pearson Correlation has been conducted between sales of types of brand and quantity of Kilogrammes sold for those types of brand. Values of Pearson correlation between Sales for White Long, Short White, Red Samba, Red Bolai, White Samba, Keeri Samba and AT Red and weights of them show that there is a strong positive correlation. There is weak correlation between the sales of Baasmadi and the weights of Baasmadi. Sig. (p values) of Sales for White Long, Short White, Red Samba, Red Bolai, White Samba, Keeri Samba and AT Red are 0.000. These values are less than 0.05 except Sales for Baasmadi. It is determined that that method of quality maintenance population category i.e. sand free rice population, stone free rice population and black free rice population differs in terms of their sales. Sig. (p values) of Sales for White Long, Short White, Red Samba, Red Bolai, White Samba, Keeri Samba and AT Red are 0.000. These values are less than 0.05 except Sales for Baasmadi. It is determined that colour of packaging (rice bag) population category i.e. white packaging population, light yellow population and light green population differs in terms of their sales.*

**Key words:** Product Mix, Sales Maximization, Rice Mill entrepreneurs, Ampara Coastal Area

## Introduction

Product mix is defined as a range of associated products that yields larger sales revenue when marketed together than if they were marketed individually or in isolation from others (Business Dictionary.com). Robert Kee and Charles Schmidt (2000) studied about a comparative analysis of utilizing activity-based costing and the theory of constraints for making product-mix decisions. Bih-Ru Lea and Lawrence, D. Fredendall, (2002) studied on the impact of management accounting, product structure, product mix algorithm, and planning horizon on manufacturing. In a discussion with few mill owners, they have replied that sales of single mill owners fluctuate time to time. Interview of one of the rice mill owners existing in Maruthamunai indicated that they mainly focus on number of paddy bags and sales volume than all other marketing mixes. One of the rice mill owners existing in Nintavur has indicated that there are arrivals of number of new rice mills in the industry. It indicates the competition increases. When

competition increases sales of rice mill owners will be shared by all the members in the industry. Researcher studied a case (Mill owner) in Oluvil. A rice mill entrepreneur was interviewed for a three hours. This lengthy discussion with mill owner indicates that his entire focus is of different sorts of rice brands and the sales volume. In an interview with some farmers indicated that most of the people own paddy lands in Ampara region. They harvest their paddy field. They keep a sufficient number of paddy bags until next harvesting season. They sell the remaining paddy bags to the rice mill owners in this region. Wholesalers have indicated that when prices of brands of rice decline retailers ask larger quantities of different brands. Wholesalers have indicated that retailers demand any form (sand free, stone free rice, etc.) of quality maintenance. Retailers do not worry about black free rice. Wholesalers have indicated that retailers demand any colour (such as white, light yellow and light green rice bag). Retailers emphasize packaging only.

and sales. These two constructs arise the following research question. *“Whether rice mill entrepreneurs focus on product mix to maximize their sales?”*

## Research question (RQ)

From the background study and the brief literature review, research problem appears on two important constructs such as product

### **Objectives of the research**

So as to answer the above research question, researcher sets the following objectives.

1. To know different types of brands sold by rice mill owners
2. To find out mode of packaging
3. To identify way of quality maintenance

### **Significance of the research**

This research is expected to contribute to rice mill owners in Ampara coastal area by clearly knowing of their products (brands). Wholesalers can satisfy their retailers who in turn can satisfy their final consumers. Rice mill clusters can contribute to Small and Medium Entrepreneurship - SME-. There are a numerous articles in product mix which was written by Bih-Ru Lea and Lawrence, D. Fredendall who studied on the impact of management accounting, product

structure, product mix algorithm, and planning horizon on manufacturing in 2002 and Robert Kee and Charles Schmidt who studied about a comparative analysis of utilizing activity-based costing and the theory of constraints for making product-mix decisions in 2000. These are in different time period and in different titles. There are few research articles in Srilankan context to the bests of researcher' knowledge. Hence, it is expected to bridge the research gap by adding new knowledge to the existing literature.

### **Literature Review**

Robert Kee and Charles Schmidt (2000) studied about a comparative analysis of utilizing activity-based costing and the theory of constraints for making product-mix decisions. Activity-based costing (ABC) and the theory of constraints (TOC) represent alternative paradigms for evaluating the economic consequences of production-related decisions. However, their application can lead to contradictory

product-mix decisions. To resolve this conflict, it is frequently suggested that the TOC is appropriate for the short run, while ABC is appropriate for the longer term. This paper models the selection of a product mix with the TOC and an ABC model integrating activity-based cost with the capacity of production-related activities. The paper demonstrates that management's discretionary power over labor and overhead resources determines when the TOC and ABC lead to optimal product-mix decision.

Equally important, it demonstrates that both the TOC and ABC may lead to a suboptimal product mix across a wide range of economic conditions. The paper developed a more general model of the product-mix decision and demonstrates that the TOC and ABC are special cases of this model. Finally, the paper discusses how the general model may be used to supplement information provided by the TOC and ABC. Bih-Ru Lea and Lawrence, D. Fredendall, (2002) studied on the impact of management accounting, product structure, product mix algorithm, and planning horizon on manufacturing performance. This paper examined how three types of management accounting systems and two methods to determine product mix interact in both the short term and the long term to affect the manufacturing performance of two shops – one with a flat and the other with a deep

product structure – in a highly automated industry that has a significantly high overhead content. Through a large-scale computer simulation, this study provides additional insights into the product mix decision through considering fluctuations caused by environmental uncertainty, using an integrated information system that integrates a manufacturing system and a management accounting system, considering the decision-outcome dynamic over time, the choice of cost content, and using both financial and non-financial performance measures. This study found that no single shop setting is best for all performance measures. The manager must determine which performance measures are the most important to their competitive success when making a decision about selecting or changing a management accounting system, product mix algorithm, or product structure.

### **Research framework**

The research framework also follows 4Ps model of Philip Kotler. But it differs by considering only one P i.e. Product along with a different dependent construct i.e. sales. Marketing mix is still valid and helpful in all industries (e.g. service as well as manufacturing). If a company does not have right price, product/ service quality, promotion and place or any other right

marketing mix elements, it cannot create or achieve the relationship mix of components offers a company a good opportunity to create a good total relationship with existing and potential customers (Zineldin, 2000). This model has widely used and valid constructs which have been tested for a long time.



Exhibit 1: The rapport between Product and sales

**Operationalization:** Philip Kotler (2000), Larry Steven Londre (2009) Arens, Weingold, Arens (2008) have quoted that a marketer's task is to build a marketing program or plan to achieve the company's desired objectives. The marketing program consists of numerous decisions in the mix of marketing tools to use. The marketing mix is the set of marketing tools the firm uses to pursue its marketing objectives in the market. These tools are broadly classified into four groups namely, product, price, place and promotion. These are called the 4Ps of marketing. The tools are broadly

classified into four groups namely Product, Price, Place and Promotion. The particular marketing variables under each P are Product variables such as product variety, quality, design, features, brand name, packaging, sizes, services, warranties, returns; price variables such as list price, discounts, allowances, payment period and credit terms; promotion variables such as sales promotion, advertising, sales force, public relations and direct marketing; place variables such as channels, coverage, assortments, locations, inventory and transport

## Research Design and Methodology

### *Exploratory research design*

Interview and discussion with related people are used to define research problem with small sample size. Research problem is qualitative. Conclusive research design is done by descriptive and causal research

design. Cross- sectional research is also designed as descriptive. Data are collected only once from sample out of population. Further, causal research is designed to know the relationships between dependent and independent variables.

### *Methodology*

Target population: Primary Sampling Units (PSU) are all the research sites. i.e. the small and medium rice mills located in Ampara Coastal area. Secondary Sampling Units (PSU) are all the respondents i.e. mill owners who own small and medium rice mills in this area. Sample size of the PSU is selected by using PPS – cumulative total method-. SSU is selected from the selected

PSUs. Sample size is calculated by formulae. Of the 182 rice mills, researcher has to select 88 rice mills as PSU. Sampling procedure is the unequal probability selection. i.e. Probability Proportionate to Size (PPS) cumulative total method is used to calculate PSU. Researcher used a 3 digit random table.

### *Pilot survey*

Pilot survey was conducted as a pretest for refining the questionnaire. Questionnaires were filled by trained enumerators. Enumerators are Undergraduates (UGs) in Department of Management and Commerce, Faculty of Management and Commerce, South Eastern University of Sri Lanka. 05 UGs undertook the questionnaire filling. 15 questionnaires have been entrusted with

each UGs in Akkaraipattu and Kalmunai. Data collection lasted for about two weeks. Primary data collection is made. Method of administering questionnaire is self-administered questionnaire. Questionnaire consisted three sections such as background information, independent constructs and dependent constructs. Questions are both open- ended and closed- ended questions. Number of questions is 15. It took around a

half an hour to fill the questionnaire. After collecting questionnaire was cleaned and open ended questionnaires were post coded.

Data analysis and presentation is done using SPSS with the version of 16.0. Correlation test and F test are used to test hypotheses.

## **Results and Discussion of Findings**

### ***Product variety***

76 % & 24 % of rice mill owners sells rice and paddy (rice & paddy) respectively. All the rice mill owners sell rice to wholesalers.

### ***Number of brands***

53%, 21%, 16% & 10% of the mill owners sell 3, 4, 5 and 6 rice brands. They sell 3 brands of rice on an average basis. Rice mill

owners sell 3 to 6 brands of rice. Around 50 % of the rice mill owners sell three brands on an average base. Other 50 % sell more than 3 brands

### ***Type of brand***

75 % of the rice mill owners sell White Long. 25 % sell nothing. 80 % of the rice mill owners sell Short White. 20 % sell nothing. 75 % of the rice mill owners sell Red Samba. 25 % sell nothing. 43 % of the rice mill owners sell Red Bolai (Autocaran). 57 % sell nothing. 46 % of the rice mill owners sell White Samba. 54 % sell nothing. 37 % of the rice mill owners sell Keeri Samba. 63 % sell nothing. 23 % of the rice

mill owners sell AT Red. 77 % sell nothing. 3 % of the rice mill owners sell Baasmadi. 93 % sell nothing.

80 % of the rice mill owners sell Short White (Naadu). 75 % of them sell White Long and Red Samba. Red Bolai (43 %), White Samba (46 %), Keeri Samba (37 %), AT Red (23 %), Baasmadi (3 %) are sold by lower than 46 % of rice mill owners.

### ***Brand Weight***

35%, 17%, 23% & 25% of the rice mill owners sell 5Kg, 10Kg, 25Kg & 50Kg of Long White. 79% & 1% of the rice mill owners sell 10Kg & 25Kg of Short White. 20 % of the rice mill owners sell nothing.

75% of the rice mill owners sell 25Kg of Red Samba. 25 % of the rice mill owners sell nothing. 43% of the rice mill owners sell 50Kg of Red Bolai. 57 % of the rice mill owners sell nothing. 25% & 21% of the rice mill owners sell 10Kg & 25Kg of White

Samba. 54 % of the rice mill owners sell nothing. 19% & 18% of the rice mill owners sell 10Kg & 25Kg of Keeri Samba. 63 % of the rice mill owners sell nothing. 6% & 17% of the rice mill owners sell 10Kg & 25Kg of AT Red. 77 % of the rice mill owners sell nothing. 3% of the rice mill owners sell 50Kg of Baasmadi. 97% of the rice mill owners sell nothing.

Long White can be sold at any of the weight such as 5 Kg, 10 Kg, 25 Kg and 50 Kg.

### ***Selling price for brand type per Kg***

Price range for Long White per Kg is = 5 Rs (50 – 45 Rs). Mean and standard deviation are 47.5 & 2 Rs respectively. Price range for Short White per Kg is = 5 Rs (53 – 48 Rs). Mean and standard deviation are 50.5 & 2 Rs respectively. Price range for Red Samba per Kg is Rs = 5 Rs (65 – 60Rs). Mean and standard deviation are 62.5 & 2 Rs respectively. Price range for Red Bolai per Kg is = 5 Rs (63 – 58 Rs). Mean and

Short White can be sold only at 10 Kg. Red Samba can be sold only at 25 Kg. These three brands are the fast moving brands. Red Bolai can only be sold by 50Kg. This is a niche market for a certain group i.e. sugar patients. White Samba, Keeri Samba and AT Red can be sold at 10 Kg. & 25 Kg. This can be a market for entertainers, wedding houses, etc. Baasmadi can be sold at 50Kg only. This can be a niche market for entertainers, wedding houses, etc.

standard deviation are 60.5 & 2 Rs respectively. Price range for White Samba per Kg is = 5 Rs (63 – 58 Rs). Mean and standard deviation are 58.5 & 2 Rs respectively. Price range for Keeri Samba per Kg is = 5 Rs (65 – 60 Rs). Mean and standard deviation are 62.5 & 2 Rs respectively. Price range for AT Red Kg is = 5 Rs (63 – 58 Rs). Mean and standard deviation are 60.5 & 2 Rs respectively. Baasmadi rice per Kg is 100 Rs.

### ***Maintenance of quality***

Of the rice mill owners, 99 % of them maintain quality in rice. 1 % does not maintain.



***Method of Quality Maintenance***

47%, 42% & 11 % of rice mill owners maintain via sand free rice, stone free rice and black free rice by respective machines.

Around 50 % of the rice mill owners maintain their quality by stone free rice.

Around 40 % maintain their quality by sand

***Packaging***

92 % of rice mill owners do their packaging.

8 % do not do.

***Colour of packaging (colour of rice bag)***

37 %, 33 % & 30 % use white, light yellow and light green for their packaging of rice bags.

***Correlation Analysis***

Pearson Correlation has been conducted between sales of types of brand and Kg sold for those types of brand. Values of them are: Sales for White Long & Kg Sold For White Long (0.999), Sales for Short White & Kg Sold For Short White (0.997), Sales for Red Samba & Kg Sold For Red Samba (0.999), Sales for Red Bolai & Kg Sold For Red

free rice. This is true because wholesalers report that retailers demand any form (either stone free or stone free rice) of quality maintenance. Retailers did not mention about the black free rice from rice mill owners. Final consumers pay a poor attention on black free rice.

Around 90 % of the rice mill owners pack their rice bags. Wholesalers requested that retailers demand any colour (such as white, light yellow and light green rice bag) as packaging. Final consumers prefer packaging but not the colour of bag.

Bolai (0.999), Sales for White Samba & Kg Sold For White Samba (0.093), Sales for Keeri Samba & Kg Sold For Keeri Samba (0.650), Sales for AT Red (0.695) and Sales for Baasmadi (0.331). All the values of Pearson correlation shows that there is a strong positive correlation between sales of types of brand and Kg sold for those types of brand.

***F test and hypotheses testing***

F test has been conducted to know how mode of packaging and way of quality maintenance varies in terms of sales.

***Hypotheses testing for method of quality maintenance***

Null hypothesis (Ho): Means of sand free population, stone free population and black free population are not different (all Means of sand free rice population, stone free rice population and black free rice population are same) in terms of their sales.

Alternative hypothesis (H1): Means of sand free rice population, stone free rice population and black free rice population are different (all Means of sand free rice population, stone free rice population and black free rice population are not same) in terms of their sales.

Sig. (p values) of Sales For White Long , Sales For Short White , Sales For Red

Samba, Sales For Red Bolai, Sales For White Samba, Sales For Keeri Samba and Sales For AT Red are 0.000. These values are less than 0.05 except Sales for Baasmadi. Researcher rejects HO and accepts H1. This means that Means of sand free rice population, stone free rice population and black free rice population are different (all Means of sand free rice population, stone free rice population and black free rice population are not same) in terms of their sales. Researcher determines that method of quality maintenance populational category i.e. sand free rice population, stone free rice population and black free rice population differs in terms of their sales.

***Hypotheses testing for colour of package (colour of rice bag)***

Null hypothesis (Ho): Means of colour of packaging populational category i.e. white, light yellow and light green population are not different (all Means of whether colour of packaging populational category i.e. white,

light yellow and light green population are same) in terms of their sales.

Alternative hypothesis (H1): Means of colour of packaging populational category i.e. white, light yellow and light green population are different (all Means of

colour of packaging populational category i.e. white, light yellow and light green population are not same) in terms of their sales.

Sig. (p values) of Sales For White Long , Sales For Short White , Sales For Red Samba, Sales For Red Bolai, Sales For White Samba, Sales For Keeri Samba and Sales For AT Red are 0.000. These values are less than 0.05 except Sales For Baasmadi.

## Conclusions

Brands sold by rice mill owners are White Long, Short White, Red Samba, Red Bolai (Autocaran), White Samba, Keeri Samba, AT Red, and Baasmadi. Rice mill owners use white, light yellow and light green bags for packaging their rice. Rice mill owners maintain via sand free rice, stone free rice and black free rice by respective machines. Pearson Correlation has been conducted between sales of types of brand and Kg sold for those types of brand. Values of Pearson correlation between Sales for White Long, Short White, Red Samba, Red Bolai, White Samba, Keeri Samba and AT Red and weights of them show that there is a strong positive correlation. There is weak correlation between the sales of Baasmadi and the weights of Baasmadi.

This means that Means of white packaging population, light yellow packaging and light green population are different (all Means of white packaging population, light yellow population and light green population are not same) in terms of their sales. Researcher determines that colour of packaging (rice bag) populational category i.e. white packaging population, light yellow population and light green population differs in terms of their sales.

Sig. (p values) of Sales for White Long, Short White, Red Samba, Red Bolai, White Samba, Keeri Samba and AT Red are 0.000. These values are less than 0.05 except Sales for Baasmadi. Researcher determines that method of quality maintenance population category i.e. sand free rice population, stone free rice population and black free rice population differs in terms of their sales. Sig. (p values) of Sales for White Long, Short White, Red Samba, Red Bolai, White Samba, Keeri Samba and AT Red are 0.000. These values are less than 0.05 except Sales for Baasmadi. Researcher determines that colour of packaging (rice bag) population category i.e. white packaging population, light yellow population and light green population differs in terms of their sales.

### **Implications for rice mill owners**

Pearson correlation indicates there is relationship between sales of types of brand and Kg sold for those types of brand. Rice mill owners can maximize sales by reducing a bit amount of price. F test indicates determines that method of quality maintenance populational category i.e. sand free rice population, stone free rice population and black free rice population differs in terms of their sales. Rice mill

owners have sand free rice, stone free rice and black free rice consumers. So, they can try to sell these types to consumers via wholesalers. Mostly preferred quality rice is sand free rice. Further, researcher determines that colour of packaging (rice bag) populational category i.e. white packaging population, light yellow population and light green population differs in terms of their sales. Mostly preferred colour of rice bag is white packaging.

### **Limitations and further research avenues**

Traditional Marketing Mix consisted of 4Ps. Researcher only consider Product P. Data for number of the Primary Sampling Units -

PSU- have been asked from a case study of Rice mill owner of Oluvil. There can be mistakes in those numbers. Demographic profile has not been analyzed due to out of scope of the research.

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