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PROCESSING ACTIVITIES OF PADDY PROCESSING INDUSTRIES IN SOUTHERN TAMIL NADU – A SWOT ANALYSIS

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ABSTRACT

Rice is the staple food of Asian countries. China and India are the two important rice production centres that supply half of the world's rice. Production in Tamil Nadu was 5536.9 tonnes during the same year. Rice milling is the largest agro-based industry wherein the outer layer (husk) and inner layer (bran) of the paddy was removed and rice is obtained. There are different forms of rice processed in Tamil Nadu and most of the consumers preferred single boiled rice. Paddy processing units processed different forms of rice namely raw rice, steam rice, single boiled and double boiled rice. Husk, Bran and Brokens were the by-products.

KEYWORDS: By-products, Paddy Processing Units, Process Flow Chart, SWOT Analysis

INTRODUCTION

Rice is the world's third most important cereal crop after corn and wheat, based on production volume. More than 460 million metric tons of husked rice was produced in the past two harvesting years worldwide. Traditionally, countries in Asia have the largest share in world rice production. With over 200 million metric tons, China is the world's leading rice producer, while India is the country with the largest area where rice is harvested.

The total food grains production in India reached 264771.1 thousand tonnes (2013-14). Production of paddy in India accounted for 106539.9 thousand tonnes during the year 2013 – 14 and the production in Tamil Nadu was 5536.9 tonnes during the same year (RBI, 2014). Paddy processing is one of the traditional agro processing industries in our country. Agro processing is defined as set of techno-economic activities, applied to all the produces, originating from agricultural farm, livestock, aquacultural sources and forests for their conservation, handling and value-addition to make them usable as food, feed, fibre, fuel or industrial raw materials.

Table 1: State-Wise Total Production of Rice (Quantity in Thousand Tonnes)

S. No	States	2011-12	2012-2013	2013-2014
1.	West Bengal	14853.00	14961.70	15313.70
2.	Uttar Pradesh	14025.00	14413.00	14628.00
3.	Andhra Pradesh	12888.00	10914.60	13027.10
4.	Punjab	10542.00	11374.00	11267.00
5.	Tamil Nadu	6893.90	4399.50	5536.90

Table 1: Contd.,

6.	Orissa	5815.20	7639.50	7583.60
7.	Karnataka	4038.00	3283.00	3758.00
8.	Bihar	7201.00	7336.00	5507.90

RBI report, 2014

Indian rice industry constitutes two forms of rice, basmati and non-basmati. The non -basmati rice production is miles ahead of basmati rice in terms of production. The basmati rice production of India constitutes less than 1 percent of the total rice produced in India. This makes the basmati sector saturated offering hardly any scope for expansion. The non-basmati sector constituting approximately 99 per cent of the total rice produced gives ample opportunity for major rice processors to thrive in domestic and international markets.

Paddy Processing

Rice grain is made up of two layer namely outer layer - husk, inner layer - bran and the endosperm. The husk layer accounts for 20 per cent of the weight of paddy and protects the grain kernel from insect and fungal attack. When the husk is removed, the rice is called brown rice. Brown rice contains the bran layer and the endosperm. The extent of the removal of the bran layer is termed as milling degree. The bran layer was removed to get the polished rice. The storage life of polished rice was highwhen compared to the brown rice. The registered food processing units (grain mill and starch products) during the year 2011 - 2012 is 19010 factories and the value of output from those industries was Rs. 1, 58, 213 crores ranking second next to vegetable and animal fat oil processing industries (Annual Survey of Industries statistics 2012) As per Ministry of Food Processing Industries Annual report (2014) highest number of registered factories are located in Andhra Pradesh (25 per cent) followed by Tamil Nadu (14 per cent)

Paddy processing is the process of removing the husk and bran layer to produce white rice and it was done by conventional and modern paddy processing units (PPUs). There are three types of processing categorized by International Rice Research Institute, Philippines such as:

One Step Process: The husk and the bran are removed in one pass and white rice is produced directly from the paddy.

Two-Step Process: The husk and the bran are removed separately, and brown rice is produced as an intermediate product.

Multistage Process: Paddy passes through a number of different operations and machines to obtain white rice.

The steps involved in the conversion of paddy to rice (Hulling section)and by-products obtained during processing of paddy is given below:

Step	Process	Description	By-products
1	Pre-cleaning	Impurities and unfilled grains were removed from the paddy	
2	Husking	The husk was removed from the paddy	
3	Husk aspiration	The husk was separated from the brown rice/ unhusked paddy	Husk
4	Paddy Separation	The unhusked paddy was separated from the brown rice	
5	De-stoning	Small stones from the brown rice was separated	
6	Whitening	The bran layer and germ was removed from the brown rice	Rice germ and Rice bran

7	Polishing	Improve the appearance of milled rice by removing remaining bran particles and by polishing the exterior of the milled kernel.	
8	Sifting	Separate small impurities or chips from the milled rice	Separate small impurities or chips from the milled rice
9	Length grading	Separate small and large brokens from the head rice	Broken rice
10	Weighing and bagging	Prepare milled rice for transport to the customer	

Conventional Vs Modern PPUs in Tamil Nadu

The processing units were classified under conventional category when the soaking was done in soaking tanks or the hulling unit comprised of the traditional huller with wooden fan box and the shaker. Generally capacity of these mills was lesser when compared to modern and hi-tech units. The processing units were grouped under modern category when the parboiling operations were carried out in steam boilers and the hulling unit comprised of sheller, cone / silky polishers, grader, colour sorter. Modern PPUs are those units wherein all the operations were fully automated and the manual interference was almost zero. The entire paddy processing was taken care by an electronic control panel.About 45 conventional and 45 modernpaddy processing units in Southern Tamil Nadu was selected and the processing details were collected.

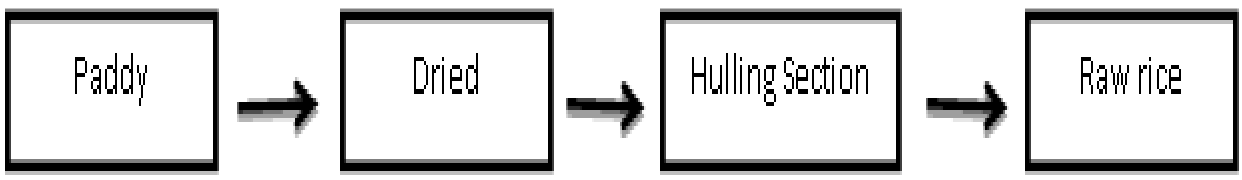
Process Flow Chart for Paddy

The steps involved in paddy processing were examined to identify the occurrence of wastes throughout the process. The head rice was the economic output and husk, chaff, bran and brokens were obtained as by-products when the paddy was processed. The husk was utilized as energy source for the boiler and rice husk ash was obtained from the process. The chaffs were sold to the cattle feed firms and the bran was sold for extraction of rice bran oil. The coarse brokens were sold in the rice market and the fine ones were sent to the animal feed manufacturing industry.

The paddy processing units in Southern Tamil Nadu produced different forms of rice like raw rice for Karnataka and Andhra Pradesh markets, single boiled and steam rice for the consumers of Tamil Nadu and double boiled rice for Kerala markets. The paddy processing methods of all the four forms of rice are discussed below.

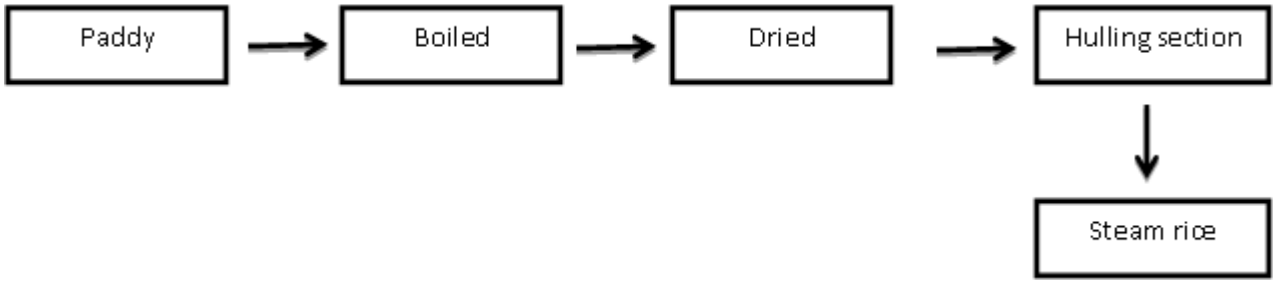
Raw Rice

The paddy was dried in the dryers and moved to hulling section and processed. The paddy was not soaked in water before the hulling operations.



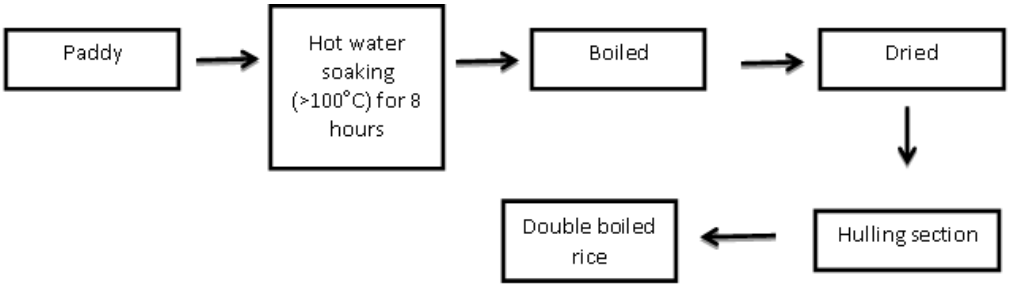
Steam rice

Paddy was boiled and dried. The dried paddy was hulled and the steam rice was obtained.



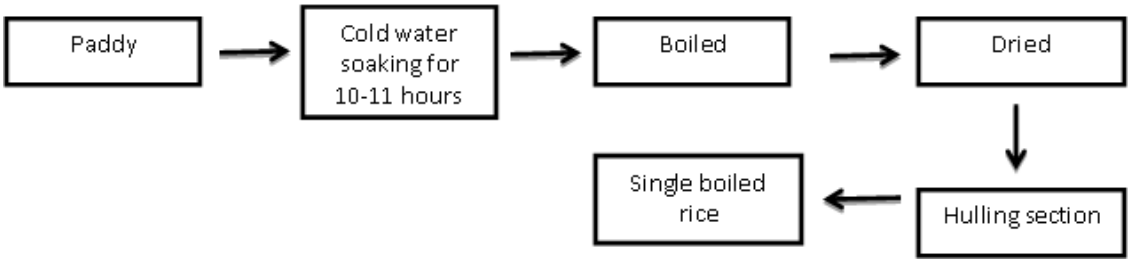
Double Boiled Rice

Paddy was soaked in hot water (more than 100^{o}C) and then boiled. It was then dried and hulled to obtain rice. Paddy was heated twice (during soaking and later during parboiling) and thus it was termed as double boiled rice.



Single Boiled Rice

Paddy was soaked in cold water and boiled. The boiled paddy was dried and hulled to obtain single boiled rice.



Thus, the different forms of processed rice in both the conventional and modern paddy processing in Southern Tamil Nadu are the raw rice, steam rice, single and double boiled rice. Though all these forms of processed rice are produced, single boiled rice was processed to a larger extent contributing to almost 90 per cent of the total share of production. This was so because of the fact that the consumers in Tamil Nadu preferred this form of rice.

The process flow charts depicted the conversion of paddy to different forms of rice to meet the market demand. Consequently further analysis of the conversion of paddy to rice was attempted to understand the various aspects including the efficiency of processing in conventional and modern units. Paddy was processed either by the conventional or modern technology. PPUs were categorized under conventional when the entire unit followed traditional processing methods or when a unit followed soaking and boiling operations in conventional way. Modern and Hi-tech mills adopted advanced technology for processing the paddy. Paddy was procured from the market (local / other state) or directly from the farmers. The procured paddy was checked for its moisture content at the time of the arrival in the unit. The moisture content of the newly harvested paddy would be higher when compared to the older stocks. While procuring the harvested paddy during the season (November - March), care was taken to dry and store it to prevent from the pest and pathogenic infestation.

All the paddy processing units followed drying process before prolonged storage. It was then processed to obtain rice and the process flow charts for single boiled rice in conventional and modern paddy processing units are presented (Figure 1 and 2) as it formed the major share of production across the Southern Tamil Nadu.

SWOT Analysis of Paddy Processing Business

Strengths

- All the units have built a huge marketing network to extend the reach of its products to retail outlets in all the places within the state.
- The size of the domestic market is huge.
- Vast network of manufacturing facilities of the equipments / machineries all over the country on par with imported machineries.
- Support from the government as agro-processing is one of the important agribusiness.
- Wide varieties of rice (raw rice, steamed rice, single and double boiled rice) available in the domestic market.

Weakness

- Requirement of high working capital to run the business since procurement and storage of raw materials need substantial investment.
- Inadequate automation with respect to information management. The market information is not being shared between processing units.
- The linkage between the paddy processing industry and research institutions was not adequate.

Opportunities

- The consumption of rice increases year after year and being staple diet for most of the countries across the world, its demand would rise further.
- The domestic and export consumers were sensitive and conscious about food quality and thus the use of nutritive premium quality rice is growing at a higher rate.
- Since brown rice is rich in its nutritive content, markets could be explored and exploited.
- Modern retailing helped the consumers to expose and use the branded products through organized retail. This trend was reflected in rice where there is a shift from unbranded to branded rice and from economy to premium rice. The sales of the branded rice in the domestic and export market were expected to grow in future.
- The export of non - basmati rice had increased 8.4 per cent during the year 2013 – 14 when compared to last year. The non-basmati sector constituting approximately 99 per cent of the total rice produced gives ample opportunity for major rice processors to take up value addition activities so as to thrive in domestic and international markets.

Threats

- Competition from the local players operating in the similar field poses a threat in the short run.
- Growth in private label particularly in leading super markets and whole sale agents could diminish the firm's branded business in local and international markets.
- Competition from neighboring state may hinder the profit in the local market.
- Rapid developments in the paddy processing industries located in other states would pose a big threat to the local players in terms of pricing, value addition and economies of scale.
- Depend on neighbouring states for the round the year availability of raw materials.
- Paddy processing units were categorized under polluting industries due to the dispersion of rice husk ash and liquid effluent generation.

CONCLUSIONS

Modern paddy processing units were more efficient in processing of paddy into rice and most of the units in Southern Tamil Nadu processed all forms of rice. Single boiled rice was preferred form of rice among the consumers in Southern Tamil Nadu. The market for single boiled rice was almost saturated and there were many players in the market. The industry faced many issues related to pollution and new markets to be explored to make the business sustainable in future. The export market for different forms of rice could also be exploited at national and international level.

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APPENDICES

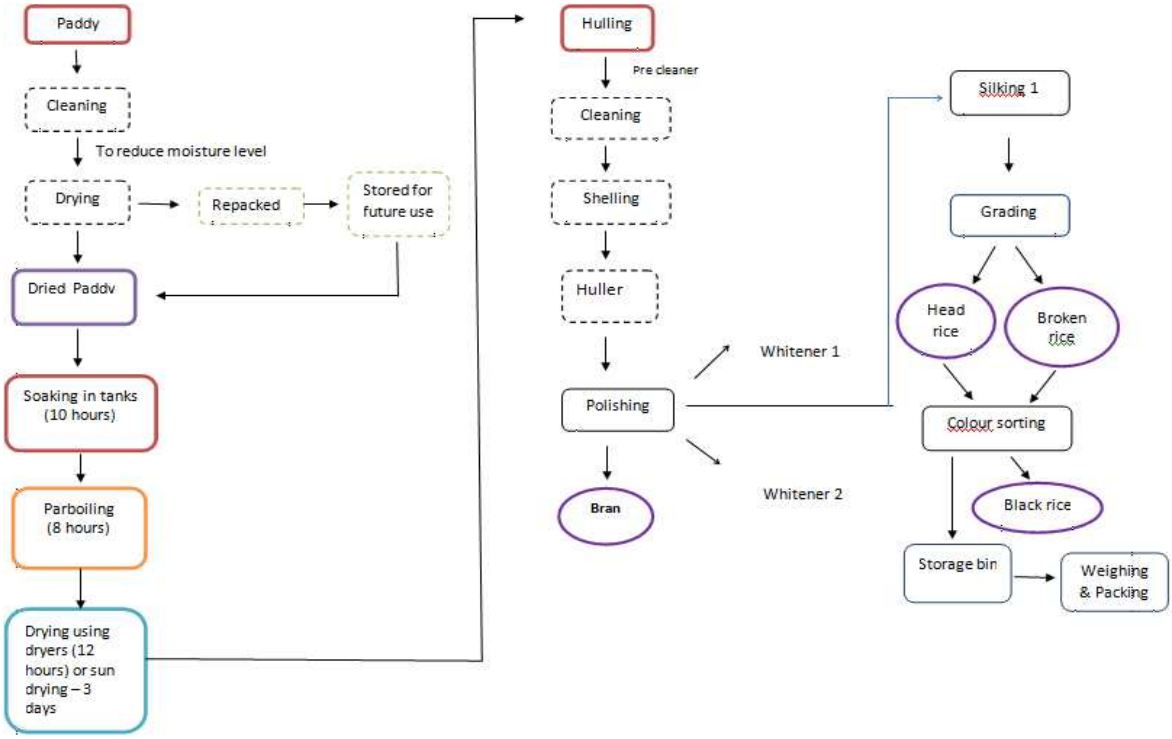

Figure 1: Flowchart for Single Boiled Rice in Conventional Paddy Processing Unit

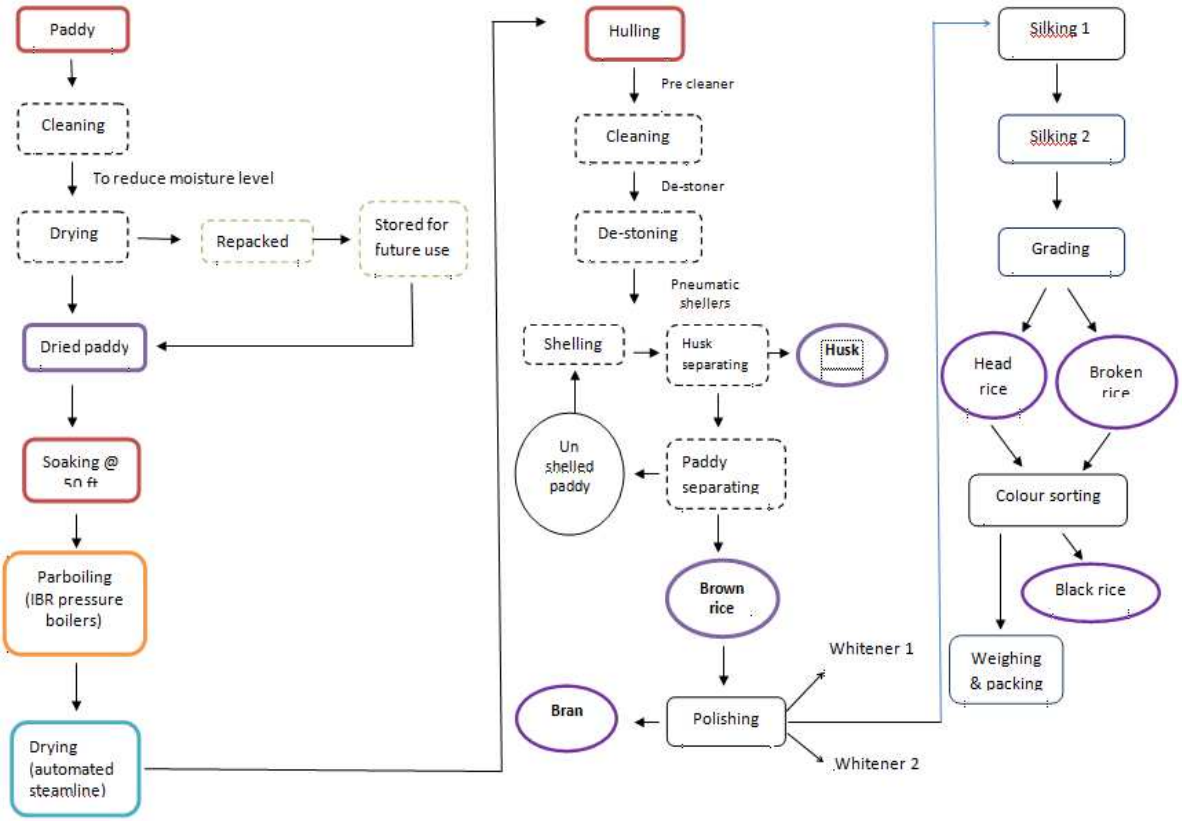

Figure 2: Flowchart for Single Boiled Rice in Modern Paddy Processing Unit