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## **COST AND BENEFITS, MARKETING AND PROFITABILITY FACTORS OF REGISTERED SEED PADDY FARMERS**

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### **Abstract**

The present study investigated the cost and benefit seed paddy production, marketing of seed paddy and examined the factors affecting the profitability of certified seed paddy producers in a coastal part of Ampara district. 120 seed paddy farmers were randomly selected by stratified sampling technique. Randomly selected farms were visited and the farmers were interviewed with the help of a structured questionnaire. The study found that the average total cost of production per acre was Rs. 45,114.00 out of it 26% and 27% of the cost was covered by machinery and labour cost and the average profit per acre Rs. 29,087.00. about 92% seed paddy farmers market their product to local farmers only 8 % of the farmers sold to both private and public firms. On average 1,590.6 kg per acre was sold for Rs 46.67 per kilogram. The stepwise multiple regression estimation results revealed that the level of education of a farmer, the extend of cultivated land, usage of power weeder, farm gate price of the seed paddy and the availability of extension services significantly impacted positively. In contrast, the cost of production per acre was significantly affected negatively. The results of the research recommend that the training of handling power weeders should be given to seed paddy farmers or farmer organization. Further, the power weeder and other advanced types of machinery need to provide a subsidy basis to the farmers to increase productivity. Finally, the government agricultural organizations and the private agricultural firms should consult and make available their extension services for wide range seed paddy farms.

**Keywords:** Seed paddy, cost and benefit, marketing, profitability

### **Introduction**

Paddy is the wetland crop cultivated all over Sri Lanka. The total paddy land cultivated was 1.1 million hectares in Sri Lanka (Department of Census and Statistics Sri Lanka, 2019). There are two main cultivation seasons namely Maha and Yala seasons, which are separated under the two main monsoonal spots of rain in Sri Lanka. Ampara district is the highest paddy yielding district in Sri Lanka and total production was 561,000 metric tons in 2018 (Department of Census and Statistics Sri Lanka, 2019).

The highest average yield, farm gate price, and net revenue were observed in Ampara district, whereas the cost of production of a unit paddy was the lowest compared to other large paddy growing areas in Sri Lanka (Central Bank of Sri Lanka, 2018).

Farmers in Sri Lanka are now planting plenty of the outstanding paddy varieties and their commitment to higher yields is therefore constantly being made by farmers to try to get the best seed available in capacity. The majority of farmers (90%) use rice seed by themselves from their previous season paddy cultivation or borrow from neighbouring farmers. However, the certified seed paddy is recommended by the Department of Agriculture (DOA). Seed Certification is a legally approved system to maintain the quality of seeds during seed production, post-harvest operations and formal distribution of seeds. It includes field inspections, at the prescribed time and crop stages, various quality tests, pre-and post-control plots with the perfect monitoring system. The quality of seed paddy is checked by the Seed Certification Service (SCS) of the Department Of Agriculture (DOA).

At present, the seed paddy supply system is controlled by a multi-institutions where many sectors involve such as; the first one is public sector agencies. There are two major public sector organizations currently involved in rice seed production along with the DOA namely; Provincial Agriculture Departments and Mahaweli Authority of Sri Lanka (MASL). The second sector is Multi-Purpose Co-operative Societies (MPCS) which are having qualities of public and private sectors and the village level organizational structure for both production and distribution of seed paddy. The private sector is the third sector consists of formal and informal companies involve in local seed paddy production and marketing. Finally, the individual farmer, the majority of them had been the contract seed growers of the DOA in the past. As such, they possess the technical know-how to produce quality seed and are recognized as good seed producers at the village level.

Considering the seed paddy market, the outlets of selling seed paddy mostly exist in the urban areas in the district. Due to the scarcity of quality seed paddy of recommended rice varieties at village level leads the farmers to purchase seed paddy from local seed producers in the village. Similarly, rural farmers think that purchasing seed paddy from outlets exist in urban regions is time-consuming and costly resulting that, certified seed producers tend to face a significant impact on their profitability. Therefore the present study evaluated the cost and benefit seed paddy production, marketing of seed paddy and examined the factors affecting the profitability of certified seed paddy producers in Ampara district, Sri Lanka.

## **Review of literature**

Although Sri Lanka achieves self sufficiency in rice production, farmers are unable to achieve good profit out of their business (Hilal & Mubarak, 2013). The marketing activities of seed paddy produced by farmers can be described as seed paddy production, cost of production, profitability, distribution, packaging, and pricing. Guei et al. (2011) suggested that the quality seed paddy production was the important means to increase the average yield of the farmer and the quality seed paddy production was based on the development of technical and managerial capacities of smallholder farmers. Similarly, Dhanapala (2000) stated that location-specific cultivar with quality seed paddy maximizes the yield and quality of harvest further revealed,

farmers found difficulties in obtaining a timely supply of seed paddy at a reasonable price, therefore farmers were motivated in self-seed paddy production. The profit margin of paddy production was not significantly higher (Senanayake & Premaratne, 2016) and the seed paddy production is more profitable than paddy sales for consumption as the price of the traditional paddy was three times the selling price of rice from the conventional method (Horgan et al., 2018). The success of the seed business run by smallholder farmers was dependent on building strategic and functional business linkages with service providers in the community and the country (Guei et al., 2011).

To become successful in marketing, firms should focus on customers. Eventhough, marketing costs are the major expenses for organisations, marketing leads to improved profitability, business performance and benefits the economy as a whole (Ishar & Mubarak, 2017). Factors affecting the profitability of a firm were investigated and found from the following literature. The study on the profitability of beef production was investigated by Ramsey et al. (2005) found that the production capacity thus the herd size and use of new machinery were the significant factors. Age and size of the firm was significantly impacted the profitability (Mubarak, 2019a; Agiomirgianakis, Voulgaris, & Papadogonas, 2006; Margaretha & Supartika, 2016). Further, the cost of inputs such as the price of chick, feed and cost of labour as well as the length of production cycle were the significant factors affecting the layer production profitability negatively whereas the outprice of the egg had a significant positive impact (Cevger & Yalçin, 2003; Ebraheem, AL-Sharafat, & Mohammad, 2012). Investigation on the profitability of vegetable farm in Switzerland found that the demographical factors like educational level and the size of the farm were significantly impacted positively (Masuku & Xaba, 2013).

The profitability of indigenous chicken farming was positively affected by the availability of extension services and the experience in farming significantly (Mufeeth, Korale, & Rthnasekara, 2015; Natukunda, Kugonza, & Kyarisiima, 2011). Further, the profitability of indigenous product was significantly impacted by consumer preference and consumer willingness to pay (Mufeeth, 2018; Mufeeth & Thariq, 2019). Similarly, the access of pure planting material, input cost and usage of better machinery were found to be significantly influential factors in the profitability of carrot production farm (Bashir, Sarfraz, & Khuda, 2005). Lososova and Zdenek (2014). foud that the profitability of farms was impacted by external economic factors climatic conditions and price development. Based on the literature on factors affecting the profitability of various firms were conceptualized as indicated in Figure 1.

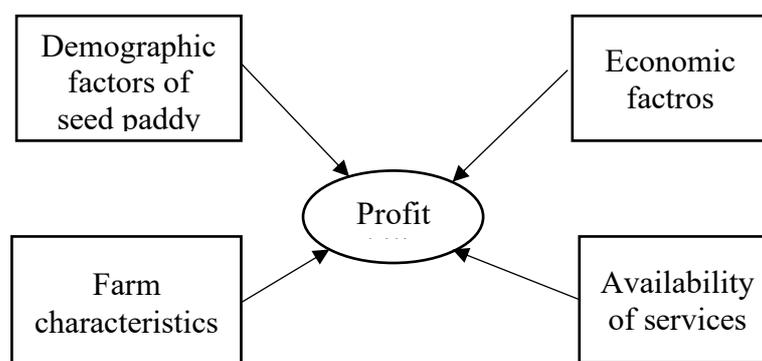


Figure 1: Conceptualization of factros affecting profitability of seed paddy farm

## Methodology

The study was conducted in Akkaraipattu, Alayadivembu and Addalaichennai Divisional Secretariat (DS) divisions where a higher population of registered seed paddy farmers were practising seed paddy production in Ampara district. The research investigated the cost and benefit, the present market of seed paddy production business and the factors affecting the profitability of registered seed paddy farmers in the study area. A questionnaire survey was conducted from March 2019 to June 2019 by interviewing each randomly selected farmer. 120 seed paddy farmers were randomly selected by stratified sampling technique as indicated in Table 1. First A list of Certified Seed Paddy farmers in the Agricultural Instructor (AI) ranges was prepared by extracting the details from Certified Seed Paddy registers in the seed certification services (SCS). Then based on the population of seed paddy farmers in the DS the stratified random sampling was carried out. The sample represents more than half of the population of each stratum.

Table 1: Distribution of seed producers and respondents in the selected DS areas

DS divisions	Number of seed paddy farmers	Sample Respondents	Percentage of sample based on population
Akkaraipattu	88	50	57
Alayadivembu	60	38	53
Addalaichennai	52	32	62
<b>Total</b>	<b>200</b>	<b>120</b>	<b>100</b>

The multiple linear regression model was employed to find the significant factors affecting the profitability of seed. Based on the conceptualization of the factors the variables indicated were hypothesized and included as independent variables and the multiple regression model was constructed as follows.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + u$$

Where,

Y – Profit (Rs/kg)

X<sub>1</sub> – Experience in farming (Years)

X<sub>2</sub> – Level of education of farmer (Years)

X<sub>3</sub> – Extend of land (Acres)

X<sub>4</sub> – Usage of transplanter (Yes/No)

X<sub>5</sub> – Usage of power weeder (Yes/No)

X<sub>6</sub> – Usage of combine harvester (Yes/No)

X<sub>7</sub> – Productivity (kg/Acre)

X<sub>8</sub> – Cost of production (Rs/Acre)

X<sub>9</sub> – Farm gate price of seed paddy (Rs/kg)

X<sub>10</sub> – Availability of extension services (Yes/No)

The regression equation was estimated by applying a stepwise regression procedure in the SPSS version 25. In the stepwise procedure, explanatory variables were included in the equation respectively starting from a variable having the highest correlation with a dependent variable and the ones that were deemed to be statistically insignificant at  $p < 0.15$  were automatically dropped from the equation. Thus, the best model that explains the dependent variable can be without multiple models needing trial and error. The model had included only their linear terms.

## Results and Discussion

This section is mainly divided into three major sections according to the objectives of the research. The first section discusses what were the costs and benefits of registered seed paddy farmers in the study area. The second section explained the quantity sold to market and quantity stored out of the production as well as the market price. Finally, the section elaborates the factors affecting the profitability of seed paddy farmers.

### *Cost and benefits of seed paddy production*

The cost and benefit were calculated for an acre (0.4 ha) of seed paddy cultivation. The average costs of all inputs and returns considered for this analysis as shown in Table 2. The production of Certified seed paddy involves some additional operations compared to normal paddy cultivation, to join the seed paddy program the farmers have register as seed paddy growers with DOA at the nominal fee of Rs 400 per acre if the farm size is more than one acre the registration fees reduces (Rs 300.00 to Rs 350.00 per acre) after that Registered Seed Paddy (RSP) supplied by the DOA. The average cost of production of the area was about Rs 45,114.00 per acre and the highest average production cost was observed in Addalaichenai DS area (Rs 45,685.00/ac). Similarly, the average yield of the region was 1846.40 kg per acre (Table 2). Therefore, the average revenue of the seed paddy farmers was Rs 74, 201.00 per acre, ultimately the average profit of seed paddy production was about Rs 29,087.00 per acre which was 64.4% of the total cost of production.

Table 2: Cost and benefit of seed paddy production per acre

Costs and Benefit	Akkaraipattu	Alayadivembu	Addalaichenai	Average
Registration cost	502.33	356.67	358.33	429.83
Cost of seed paddy	429.38	4,386.10	3,881.20	4,239.00
Cost of fertilizer	1,900.00	1,697.20	1,733.30	1,805.80
Cost of weedicide	3,296.70	3,436.10	3,458.30	3,370.80
Total cost pesticide	3,106.70	2,988.90	3,275.00	3,105.00
Cost of gunny bags	3,467.30	3,595.80	2,780.00	3,368.40
Cost of machinery	11,350.00	13,139.00	11,375.00	11,892.00

Labour cost	12,533.00	11,517.00	13,792.00	12,480.00
Irrigation cost	350.00	280.01	254.17	310.00
Harvesting cost	3,556.70	4,125.00	3,916.70	3,799.20
<b>Cost of production</b>	<b>44,888.00</b>	<b>45,685</b>	<b>44,824.00</b>	<b>45,114.00</b>
Quantity sold (kg/ac)	1,566.70	1,546.30	1,684.20	1,590.6
Price of seed paddy (Rs/kg)	46.67	47.50	45.42	46.67
<b>Gross return</b>	<b>71,861.00</b>	<b>83,950.00</b>	<b>76,496.36</b>	<b>74,201.00</b>
<b>Profit</b>	<b>26,973.00</b>	<b>38,265.00</b>	<b>20,605.00</b>	<b>29,087.00</b>
<b>B:C Ratio</b>	<b>1.60</b>	<b>1.84</b>	<b>1.71</b>	<b>1.64</b>

The average B: C ratio found to be 1.64 thus the average benefit from seed paddy production was 1.64 times higher than the average total cost for producing seed paddy from an acre land. Further, the result revealed that the seed paddy business is financially viable.

#### *Marketing of seed paddy*

Seed paddy marketing is a severe problem among farmers as certified seed paddy producers had a huge competition with non-certified seed producers who do not have proper marketing facilities. Higher portion of certified seed producers (92%) sold to local farmers, while 8 per cent of them sold to private and public organizations. Around 36.7 per cent of them sold their seed paddy through a middleman where this is the most advantageous approach for them. The average quantity of sold seed paddy was 1,590.6 kg per acre for Rs 46.67 per kilogram in the last 'Maha' season in the study area and the maximum seed paddy was marketed Alayadivembu DS division where the lowest amount of seed paddy was marketed in Addalaichenai DS division (Table 3). If farmers could not sell the seeds they stored for consumption purposes or sell as a normal paddy at a lower price. The average paddy storage was 640 kg per season per farmer and the majority of the seed paddy stored in Akkaraipattu DS division (816 kg) while the low quantity was observed in Alayadivembu Ds division (354 kg).

Table 3: Regional average sold quantity, farmgate price and storage

Locations	Quantity sold (kg)	Farm gate price (Rs/kg)	Storage (kg/season per farmer)	Yield (kg/ac)
Akkaraipattu	1,546.30 (383.97)	46.67 (2.27)	816.18 (73.94)	1,818.60 (215.43)
Alayadivembu	1,763.60 (442.57)	47.50 (2.18)	353.75 (65.41)	2,123.20 (223.65)
Addalaichenai	1,441.70 (209.10)	45.42 (1.08)	539.46 (33.66)	1,500.60 (291.56)
Area average	1,590.60	46.67	639.52	1,846.40

(389.48)

(2.15)

(54.12)

(282.94)

*Factors affecting the profitability of seed paddy farmers*

The multiple linear regression analysis results are presented in Table 4. The coefficient of determination ( $R^2$ ) of the model was 0.67 which indicated that 67 per cent of variations in the profitability of seed paddy farmers were explained by the selected explanatory variables. The model was estimated via stepwise regression method can be expressed as follows.

$$Y = 1.64 + 1.02 X_1 + 2.09 X_2 + 7.29 X_3 + 2.31 X_4 + 2.43 X_5 + 1.23 X_6 + 2.68 X_7 - 1.89 X_8 + 1.07 X_9 + 5.28 X_{10}$$

Table 4: Multiple regression results of profitability factors

Variables	Coefficient	Std. Error	Sig
Constant	1.64	1.27	0.742
X <sub>1</sub>	1.02	0.97	0.816
X <sub>2</sub>	2.09	0.64	0.027*
X <sub>3</sub>	7.29	2.91	0.013*
X <sub>4</sub>	2.31	2.07	1.039
X <sub>5</sub>	2.43	1.05	0.047*
X <sub>6</sub>	1.23	1.03	0.789
X <sub>7</sub>	2.68	2.05	1.249
X <sub>8</sub>	-1.89	0.37	0.032*
X <sub>9</sub>	2.07	0.21	0.001**
X <sub>10</sub>	5.28	0.37	0.000**

\* Significant at 5% level, \*\* Significant at 1%,  $R^2 = 0.67$

The results reveal that level of education (X<sub>2</sub>) significantly and positively impacted the profitability of seed paddy farmers, one year increase in farmers education lead to increase Rs. 2.09 per kilogram. Thus, the farmer's knowledge of seed production would increase with educational improvements. Similarly, the extent of land of the farmer (X<sub>3</sub>) that they cultivated significantly increase the profitability of seed paddy business. The findings show that the one-acre rise in the seed paddy land increased the profit per kilogram of seed paddy by Rs. 7.29. Further, if a farmer used power weeder (X<sub>5</sub>) for weeding significantly increase the profit by Rs. 2.43 per kilogram of seed paddy. Usage of power weeder is the new improved technology used for weeding in the paddy field. The cost for weeding such as hand weeding, application of weedicides reduced by the usage of weeders especially the hand weeding is highly labour intensive work the usage of weeders declines the labour cost.

The one rupees increase in the cost of production (COP) per acre (X<sub>8</sub>) will lead to a decline in the profit by Rs. 1.89 per kilogram of seed paddy. Thus the cost of production can be increased by the input material cost, labour cost and capital cost. Particularly the expense of

agrochemical would lead to higher COP as the farmers buying behaviour is significantly impacted by the attitudes of the farmer and the farmers in the study area have an attitude to apply agrochemicals beyond the recommended level of application (Mubarak, 2019b). Farmgate price of the seed paddy (X9) significantly had a positive impact on the profitability hence, one rupees increment in the farm gate price in the market will increase the productivity by Rs. 1.07 per kilogram. The output price raises the profit margin. Further, the analysis result showed that the reduction in profit utilizing COP was lesser than the profitability raise through the increment of the farm gate price. Finally, the availability of extension services (X10) caused a significant positive impact on profitability, the magnitude explains that the extension services provided by both Department of Agriculture and other private institutions were useful to the seed paddy farmers to grow the profit.

### Conclusion and Recommendation

In conclusion, the survey study found that the average total cost of production per acre was Rs. 45,114.00 out of it 26% and 27% of the cost was covered by machinery and labour cost. Further, the average gross return and profit per acre were Rs. 74,201.00 and Rs. 29,087.00 respectively and the profit represented 64.4% of the total cost of production. Most of the seed paddy farmers market the seed paddy to local farmers only 8 per cent of the farmers sold to firms. On average 1,590.6 kg per acre was sold for Rs 46.67 per kilogram. Unsold seed paddy was stored for consumption or sold as normal paddy practice by the farmers and the averagely a farmer stored 640 kg per season. The stepwise multiple regression estimation concluded that the level of education of a farmer, the extend of cultivated land, usage of power weeder, farm gate price of the seed paddy and the availability of extension services to a farm had a positive impact on the profitability of seed paddy production business significantly. In contrast, the cost of production per acre was significantly affected negatively. Among the explored significant factors extend of cultivated land and availability of extension services showed a higher marginal impact on the profitability of seed paddy production farm.

The present study recommends that the research and development activities need to be carried out to use machinery to replace labour-intensive activities. Further, the government need to facilitate the state own seed paddy yards to increase the size of the seed paddy market. Training of handling power weeders should be given to seed paddy farmers or farmer organization. Further, the power weeder and other advanced machinery need to provide a subsidy basis to the farmers to increase productivity. Finally, the government agricultural organizations and the private agricultural firms should consult and make available their extension services for wide range seed paddy farms.

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