

A HEDONIC PRICE ANALYSIS FOR ROUGH RICE  
MARKET IN SRI LANKA: IMPLICATION FOR  
QUALITY IMPROVEMENT

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# Introduction

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## **Rice**

**Main crop in Sri Lanka**

**Occupy 42% of agric. land**

**Livelihood of 800,000 farm families**

**More than 30% of total labor force**

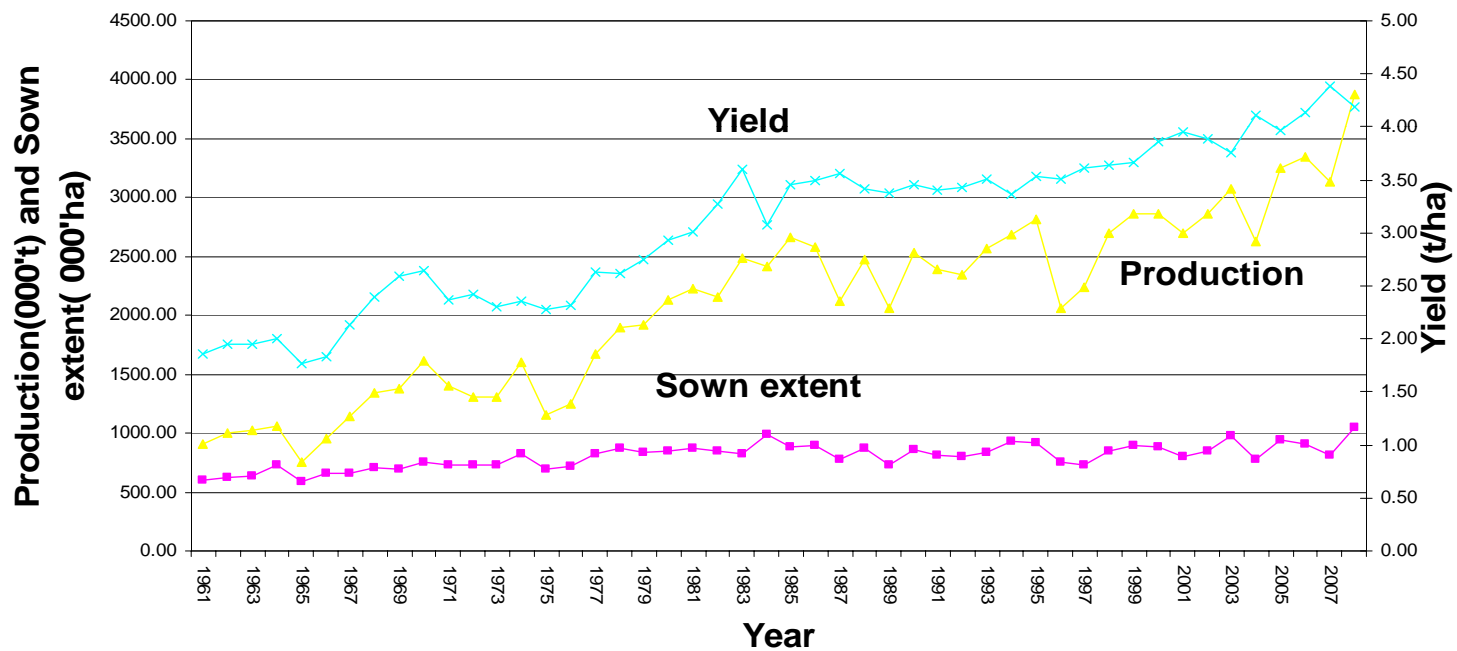
**Contribute to 1.4 of GDP**

## Past and present status of rice production

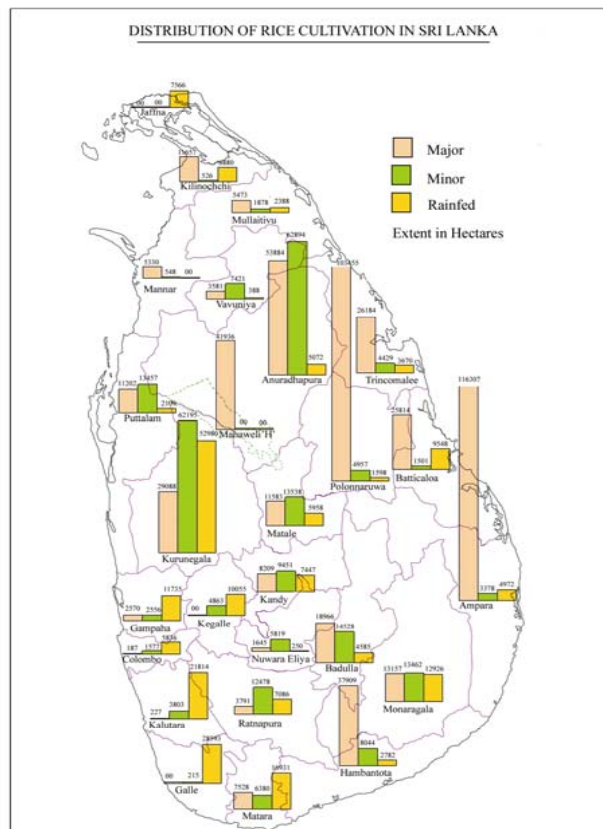
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	Year		% change
	1961	2008	
Sown extent (million ha)	0.60	1.00	67
Average yield (t/ha)	1.86	4.19	125
Production (million, t)	1.05	3.87	269

# Trend in rice production, sown extent and average yield



DISTRIBUTION OF RICE CULTIVATION IN SRI LANKA



# A current issue of rice cultivation

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- Low profitability

	SLRs	US\$
Cost of cultivation/ha	70387	612
Net return/ha	83763	728
Return to capital	2.7	2.7
Cost of production/Kg	13.40	0.12

Note; Exchange rate 1US\$ = 115 SLRS

Farm gate price of rough rice/kg: SLRS=29.30

US\$= 0.25

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- Emphasized high yield on weight basis & reducing cost of cultivation
- Given secondary importance to improve quality
- 75% of rough rice is poor quality
- Value of rough rice is influenced by its quality attributes

# Objectives

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- To examine the quality of rough rice come in for sale
- To asses the impact of quality characteristics on price of rough rice

# Methodology

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Hedonic price function developed by Lucas (1975)

$$P_i = P(V_{i1}, \dots, V_{ij}, u_i)$$

$P_i$  = the observed price of commodity  $i$

$V_{ij}$ ,  $j = 1, \dots, j$  the amount of some intrinsic quality per unit of commodity  $i$

$U_i$  = disturbance term.

## Estimated model

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- $$P = a + \sum_{j=1}^J \beta_j \chi_j + \varepsilon$$
  - $P$  = the final price (Rs/kg) paid for the rough rice;
  - $\chi_j$  = the amount of the characteristic of  $j$  in the rough rice sample;
  - $\varepsilon$  = the error term;
  - $\beta_j$  = parameters to be estimated  
(premium/discounts associated with each quality factor)
- $a$  = intercept term

## Quality factors ( $\chi$ )

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- $\chi_1$  = Moisture percentage by weight
- $\chi_2$  = Foreign matter percentage by weight
- $\chi_3$  = Type admixture percentage by weight
- $\chi_4$  = Damaged grain percentage by weight
- $\chi_5$  = Immature grain percentage by weight

## Data

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- Samples of differently-priced rough rice were collected from randomly selected rough rice buyers in Ampara
- 30 sample of short grain
- 30 sample of long grain

# Characteristics of long grain rough rice coming in for selling

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<b>Charact.</b>	<b>Mean</b>	<b>SD</b>	<b>Variance</b>	<b>Min.</b>	<b>Max.</b>
<b>Moisture(%)</b>	<b>16.10</b>	<b>1.84</b>	<b>3.40</b>	<b>14.00</b>	<b>19.00</b>
<b>Foreign matter(%)</b>	<b>1.20</b>	<b>0.65</b>	<b>0.42</b>	<b>0.50</b>	<b>2.50</b>
<b>Type admixture(%)</b>	<b>5.63</b>	<b>3.52</b>	<b>12.38</b>	<b>1.00</b>	<b>10.00</b>
<b>Damaged grain(%)</b>	<b>6.47</b>	<b>3.46</b>	<b>11.98</b>	<b>1.00</b>	<b>12.00</b>
<b>Immature grains(%)</b>	<b>14.83</b>	<b>6.51</b>	<b>42.42</b>	<b>5.00</b>	<b>24.00</b>

# Characteristics of short grain rough rice coming in for selling

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<b>Charact.</b>	<b>Mean</b>	<b>SD</b>	<b>Variance</b>	<b>Min.</b>	<b>Max.</b>
<b>Moisture(%)</b>	<b>16.07</b>	<b>1.74</b>	<b>3.03</b>	<b>14.00</b>	<b>19.00</b>
<b>Foreign matter(%)</b>	<b>1.21</b>	<b>0.66</b>	<b>0.43</b>	<b>0.50</b>	<b>2.50</b>
<b>Type admixture(%)</b>	<b>5.77</b>	<b>3.64</b>	<b>13.22</b>	<b>1.00</b>	<b>10.00</b>
<b>Damaged grain(%)</b>	<b>6.47</b>	<b>3.49</b>	<b>12.19</b>	<b>1.00</b>	<b>13.00</b>
<b>Immature grains(%)</b>	<b>13.47</b>	<b>6.81</b>	<b>46.33</b>	<b>5.00</b>	<b>24.00</b>

# Results of regression model for price of long grain rough rice

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<b>Charact.</b>	<b>Coefficient</b>	<b>SE</b>	<b>T-ratio</b>	<b>P-value</b>
<b>Moisture</b>	<b>-0.1730</b>	<b>.092</b>	<b>-1.882</b>	<b>0.072*</b>
<b>For.matter</b>	<b>-0.122</b>	<b>0.217</b>	<b>-0.561</b>	<b>0.580</b>
<b>Type admix.</b>	<b>-3.713E-02</b>	<b>0.025</b>	<b>-1.504</b>	<b>0.146</b>
<b>Dama.grain</b>	<b>-5.617E-04</b>	<b>0.027</b>	<b>-0.021</b>	<b>0.984</b>
<b>Imma.grain</b>	<b>-4.845E-02</b>	<b>0.018</b>	<b>-2.763</b>	<b>0.011**</b>
<b>Intercept</b>	<b>16.972</b>	<b>1.142</b>	<b>14.856</b>	<b>0.000</b>
<b>R<sup>2</sup></b>	<b>0.894</b>			

**\*\* and \* indicates significant level of 0.05 and 0.1 respectively**

## Results of regression model for price of short grain rough rice

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<b>Charac.</b>	<b>Coefficient</b>	<b>SE</b>	<b>T-ratio</b>	<b>P-value</b>
<b>Moisture</b>	<b>-0.170</b>	<b>0.095</b>	<b>-1.796</b>	<b>0.085*</b>
<b>For. Matter</b>	<b>0.280</b>	<b>0.290</b>	<b>0.963</b>	<b>0.345</b>
<b>Type admix</b>	<b>-5.001E-02</b>	<b>0.037</b>	<b>-1.335</b>	<b>0.194</b>
<b>Dama.grain</b>	<b>-3.398E-02</b>	<b>0.048</b>	<b>-0.704</b>	<b>0.488</b>
<b>Imma. Grains</b>	<b>-5.535E-02</b>	<b>0.025</b>	<b>-2.237</b>	<b>0.035**</b>
<b>Intercept</b>	<b>19.032</b>	<b>1.273</b>	<b>14.950</b>	<b>0.000</b>
<b>R<sup>2</sup></b>	<b>0.643</b>			

\*\* and \* indicates significant level of 0.05 and 0.1 respectively

# Discounts

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High moisture %  
High immature grain %  
over standard of premium grade

Long Grain (Rs/ha)	1972	4026
(US\$/ha)	(17)	(35)
Short Grain (Rs/ha)	1972	4163
(US\$/ha)	(17)	(36)

## Conclusions and Policy implications

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- Rough rice coming in for sale is of poor quality, falling in to the category of grade 3 or bellow of the Sri Lanka Standards for rough rice with a high degree of moisture and immature grains.

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- Discount per unit of moisture percentage in long grain and short grain rough rice is 17 cents / kg or Rs. 986(US\$=8.57) / ha.
- Discount per unit of immature grain percentage for long grain and short grain is 04 and 05 cents / kg. respectively or Rs. 281 and 321/ ha (US\$= 2.4 and 2.79) respectively.
- Depending on costs associated with controlling the quality characteristics producer may be experiencing significant economic losses as a result of price discounts associated with moisture and immature grains.

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There is significant price discount for moisture and immature grains. Therefore, producer should be aware to follow proper cleaning and drying practices in order to achieve higher profit from rice farming through improvement of the quality.

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Thank you

# Sri Lanka Standards for rough rice

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- Characteristics

	Premium	Grades		
		1	2	3
Moisture(% by mass mx.) 14.0	14.0	15.0	15.0	
For.matter(% by mass mx) 0.5	0.5	1.0	1.5	
Type ad.(% by mass mx) 1.0	2.0	6.0	10.0	
Dama.grain(% by mass mx)0.5	2.0	6.0	10.0	
Imma.grains(% by mass) 0.5	5.0	15.0	20.0	