THE IMPACT OF “KETHATA ARUNA” FERTILIZER SUBSIDY PROGRAMME ON FERTILIZER USE AND PADDY PRODUCTION IN SRI LANKA


Presented by Kumudu Herath
Paddy cultivation is an important social and economic activity in Sri Lanka

- Rice is the staple food
- 34% of agricultural land comes under paddy
- 20% of the total population & 32% of the total labour force involved in paddy cultivation
Sri Lanka imports 94% of its annual inorganic fertilizer requirement.

75% is used in the paddy sector (NFS, 2008).

“Kethata Aruna” paddy fertilizer subsidy scheme
- Implemented in 2005
- for revive the paddy sector and achieve self sufficiency in rice

Paddy fertilizer subsidy is an approach to benefit the

- paddy farmer by reducing the production cost
- consumer by increasing rice production and lowering the price
The government spends enormous amount of money on fertilizer subsidy

<table>
<thead>
<tr>
<th>Year</th>
<th>Government expenditure on paddy fertilizer subsidy (Rs. Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>6,285</td>
</tr>
<tr>
<td>2006</td>
<td>10,696</td>
</tr>
<tr>
<td>2007</td>
<td>10,167</td>
</tr>
<tr>
<td>2008</td>
<td>24,383</td>
</tr>
<tr>
<td>2009</td>
<td>23,118</td>
</tr>
<tr>
<td>2010</td>
<td>22,344</td>
</tr>
<tr>
<td>2011</td>
<td>36,960</td>
</tr>
</tbody>
</table>

Government expenditure for fertilizer subsidy (total for agriculture sector)

- 2014 – Rs. 31,858 million
- 2015 – Rs. 49,571 million

Source: Annual reports, Ministry of Finance and Planning
Introduction

Self-sufficiency in terms of rice
Increase paddy production
Promote wide use of fertilizer

Idea of the “Kethata Aruna” fertilizer subsidy scheme
1. The impact of fertilizer price on the use of fertilizers
2. Change in of fertilizer use in the paddy sector as a response to the introduction of the “Kethata Aruna” fertilizer subsidy programme
3. The impact of fertilizer subsidy on the use of recommended amount of fertilizers
4. The factors affecting the paddy production at the national level

*The study was carried out in 2011*
Methodology

- Extent of the study – National level

- Statistical and graphical analysis of data to determine trends in
  - total fertilizer use in paddy sector with respect to fertilizer price
  - fertilizer use per unit area with respect to fertilizer price
  - ratio of Urea: TSP: MOP used with respect to fertilizer price

- Determine the relationship between national paddy productions with
  - the amount of fertilizer use
  - sown extent
  - technological improvements
The history of fertilizer policy in Sri Lanka

<table>
<thead>
<tr>
<th>Year</th>
<th>Description of fertilizer subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>Introduction of the fertilizer subsidy for the first time in Sri Lanka</td>
</tr>
<tr>
<td>1962 - 1975</td>
<td>Various fertilizers were subsidized at different rates and subsidy level varied also with the crop</td>
</tr>
<tr>
<td>1975 - 2005</td>
<td>Though the subsidy rate and subsidized fertilizer varied a uniform subsidy provided to all crops</td>
</tr>
<tr>
<td>1983</td>
<td>Introduction of variable subsidy programme – under this the fertilizer price is kept fixed</td>
</tr>
<tr>
<td>1988</td>
<td>Significant increase of the fertilizer prices in the world market</td>
</tr>
<tr>
<td></td>
<td>Remove subsidy for Sulphate of Ammonia and Rock Phosphate leaving the subsidy only for Urea, TSP and MOP</td>
</tr>
<tr>
<td>1990</td>
<td>Fertilizer subsidy was removed from all sectors of agriculture</td>
</tr>
<tr>
<td>1994</td>
<td>Re-introduction of the fertilizer subsidy for Sulphate of Ammonia, Urea, TSP and MOP</td>
</tr>
<tr>
<td>1997</td>
<td>Subsidy was restricted to Urea</td>
</tr>
<tr>
<td>2005</td>
<td>“Kethata Aruna” fertilizer subsidy programme implemented. The subsidy was only for paddy farmers under certain criteria – under this Urea, TSP and MOP are given at a price of Rs. 350 per 50kg</td>
</tr>
</tbody>
</table>
Variation of fertilizer price paid by paddy farmers

- Complete withdrawal of fertilizer subsidy
- World market fertilizer price increase
- Reintroduction of subsidy for Urea, TSP, MOP & Sulphate of ammonia
- Restrict subsidy only for Urea
- Implementation of the Ketheta Aruna subsidy scheme

Price of fertilizers in Sri Lanka (Rs./50 kg)

Year

Urea  MOP  TSP

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Trends in fertilizer usage in paddy sector at national level

- **Fertilizer usage** (1000 mt)

- **Year**
  - 1980
  - 1981
  - 1982
  - 1983
  - 1984
  - 1985
  - 1986
  - 1987
  - 1988
  - 1989
  - 1990
  - 1991
  - 1992
  - 1993
  - 1994
  - 1995
  - 1996
  - 1997
  - 1998
  - 1999
  - 2000
  - 2001
  - 2002
  - 2003
  - 2004
  - 2005
  - 2006
  - 2007
  - 2008

- **World market fertilizer price increased**
- **Complete withdrawal of fertilizer subsidy**
- **Variable subsidy**
- **Reintroduction of subsidy for Urea, TSP, MOP & Sulphate of ammonia**
- **Restrict subsidy only for Urea**
- **Implementation of the Kethata Aruna subsidy scheme**

**Legend**
- **Urea**
- **TSP**
- **MOP**

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Effect of fertilizer use and sown extent on paddy production

Variation of national paddy production with total major fertilizer usage in paddy sector

Variation of national paddy production with sown extent

Individual linear relationships between total fertilizer use and national paddy production, and sown extent and national paddy production
Strong linear relationships between sown extent and paddy production in two major paddy cultivating areas in the country confirms the strong contribution of sown extent on paddy production.
Results of the multiple regression analysis

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log total fertilizer ('000 kg)</td>
<td>0.1092753</td>
</tr>
<tr>
<td>Log sown extent (ha)</td>
<td>0.8508577</td>
</tr>
<tr>
<td>Time trend</td>
<td>0.0031484</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.88</td>
</tr>
<tr>
<td>Number of observations</td>
<td>28</td>
</tr>
</tbody>
</table>

\[
\text{Log (T)} = c + \beta_1 \text{Log (TF)} + \beta_2 \text{Log (SE)} + \beta_3 (TT)
\]

$T =$ Total national paddy production ('000 mt), $TF =$ Total fertilizer use (mt), $SE =$ Sown extent (ha), $TT =$ Technological improvement as a time trend, $\beta_1, \beta_2, \beta_3$ are the respective coefficients of variation.
Percentage of fertilizers (TSP, MOP & Urea) used in the paddy sector

Year

Percentage

Urea  TSP  MOP  Recommended Urea %  Recommended Urea % + TSP %

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Annual fertilizer usage per unit sown area

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88% of the variation of the national paddy production is explained by the combined effect of total fertilizer use, sown extent and the technological improvement.

“Kethata Aruna” fertilizer subsidy scheme has promoted the paddy farmers to use more fertilizers per unit area than they have been using.

Yet the recommended levels have not exceeded at the national level on average.

Use of fertilizers in paddy sector depends on the prices of the fertilizers.

It is necessary to have a price balance in all three types of fertilizers in order to maintain the appropriate fertilizer use.
Acknowledgement

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THANK YOU
National paddy cultivation and production

![Graph showing the total sown area, total harvested area, and total production from 1979 to 2007. The x-axis represents the years, and the y-axis represents the area in 000 ha and paddy production in 000 mt. The graph indicates fluctuations in area and production over the years.]
Recommended percentages of Urea, MOP and TSP were calculated based on the dry & intermediate zone fertilizer recommendation for 3 month paddy with an expected yield of 120 bushels/ Acre and wet zone fertilizer recommendation for 3 month paddy with an expected yield of 80 bushels/ Acre (DOA, 2009).

The national paddy extent in Dry & Intermediate zones is considered as 79% while wet zone is considered as 21% (Silva, 2001).
Calculation of recommended percentage of fertilizers

<table>
<thead>
<tr>
<th>Age of paddy (month)</th>
<th>Type of fertilizer</th>
<th>Dry and Intermediate AEZ</th>
<th>Wet and Intermediate AEZ of UC and MC</th>
<th>Wet zone LC – S1</th>
<th>Wet zone LC – S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 1/2</td>
<td>Urea</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>TSP</td>
<td>25</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MOP</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Urea</td>
<td>90</td>
<td>105</td>
<td>125</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>TSP</td>
<td>25</td>
<td>35</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>MOP</td>
<td>25</td>
<td>30</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td>3 1/2</td>
<td>Urea</td>
<td>90</td>
<td>105</td>
<td>125</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>TSP</td>
<td>25</td>
<td>35</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>MOP</td>
<td>25</td>
<td>30</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td>4 – 4 1/2</td>
<td>Urea</td>
<td>95</td>
<td>105</td>
<td>125</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>TSP</td>
<td>25</td>
<td>35</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>MOP</td>
<td>25</td>
<td>30</td>
<td>45</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: Department of Agriculture (2009)

UC – Up country
LC – Low country
MC – Mid country
AEZ - Agro-ecological zone
Exp.Har – Expected harvest
S2 – Soil type 2
S1 – Soil type 1