Trade and Agricultural Competitiveness for Growth, Food Security and Poverty Reduction: A Case of Wheat and Rice Production

Raphael Gitau, Samuel Mburu and Mary K. Mathenge
Outline

- Background
  - Justification
  - Objective of the study
  - Data and Methodology
- Results
- Key Finding and Policy Options
Why Wheat and Rice?

- Wheat
  - Second most important staple after maize contributes 1.4% and 30% overall GDP and cereal GDP (Barasa, 2004)
  - Contributes over Ksh. 20 billion to the economy
  - Wheat sector employs 11.3% of the national population
  - Kenya only meets 40% of its requirement; it has continued to face structural deficit met through imports
  - Wheat and wheat products account for between 24% and 38% of total expenditure of main staples by urban households
• Rice
  • Third important staple after wheat
  • Kenya only meets 20% of its requirement it has continued to face a structural deficit met through imports
  • In the last six years consumption of rice has increased by 66%
  • Rice accounts for between 15% and 19% of total expenditure on staples in the urban households
  • The country has a potential of about 540,000 hectares for paddy rice and 1 million hectare for upland rice
• WHEAT
Wheat production in Kenya

- Production of wheat declined between by 6%
- Consumption increased by 21%
- Importation increased by 58%
- Import expenditure increased by 128%
Proportion of total wheat imported to Kenya by country of origin

<table>
<thead>
<tr>
<th>Year</th>
<th>Proportion of wheat imported</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>Russian Federation: 64%</td>
</tr>
<tr>
<td></td>
<td>Argentina: 6%</td>
</tr>
<tr>
<td></td>
<td>Ukraine: 30%</td>
</tr>
<tr>
<td></td>
<td>Other Countries: 6%</td>
</tr>
<tr>
<td>2005</td>
<td>Russian Federation: 26%</td>
</tr>
<tr>
<td></td>
<td>Argentina: 10%</td>
</tr>
<tr>
<td></td>
<td>Ukraine: 37%</td>
</tr>
<tr>
<td></td>
<td>Other Countries: 26%</td>
</tr>
<tr>
<td>2006</td>
<td>Russian Federation: 26%</td>
</tr>
<tr>
<td></td>
<td>Argentina: 3%</td>
</tr>
<tr>
<td></td>
<td>Ukraine: 27%</td>
</tr>
<tr>
<td></td>
<td>Other Countries: 27%</td>
</tr>
<tr>
<td>2007</td>
<td>Russian Federation: 20%</td>
</tr>
<tr>
<td></td>
<td>Argentina: 15%</td>
</tr>
<tr>
<td></td>
<td>Ukraine: 3%</td>
</tr>
<tr>
<td></td>
<td>Other Countries: 11%</td>
</tr>
</tbody>
</table>
RICE
Rice production in Kenya

- Slight decline in production by 6%
- Consumption increased by 66%
- Imports increased by 90%
Objective

- Establish cost of production at the farm level
- Establish where inefficiencies lies along the value chain
- Explore policy option that may address inefficiency along the value chain
Data

- Wheat farmer in Narok, Nakuru and Uasin Gishu (n=129)
- Traders and transporters along the wheat value chain (n=16)
- Rice farmers in Mwea and Ahero Schemes (n=40)
- Rice farmers in Mbale and Iganga in Eastern Uganda (n=20)
- Traders and millers along rice value chain in both Kenya (n=20) and Uganda (n=10)
- Tegemeo urban survey, 2009
- Import parity prices for wheat and rice
Methodology

- Production cost at the farm level
- Compute technical and efficiency scores
- Costs and margins along the value chain
- Comparing local cost versus import costs
- Evaluate competitiveness of locally produce wheat and rice compared to imports
RESULTS
### Cost of wheat production at farm level

<table>
<thead>
<tr>
<th>Items</th>
<th>Efficient</th>
<th>Average</th>
<th>Least Efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yields (90 kg bag)/acre</td>
<td>16</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Price per bag</td>
<td>2,800</td>
<td>2,800</td>
<td>2,800</td>
</tr>
<tr>
<td>Gross Output</td>
<td>44,800</td>
<td>33,600</td>
<td>25,200</td>
</tr>
</tbody>
</table>

#### Cost of Production/acre

<table>
<thead>
<tr>
<th>Cost</th>
<th>Efficient</th>
<th>Average</th>
<th>Least Efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery operation</td>
<td>5,400</td>
<td>4,200</td>
<td>4,200</td>
</tr>
<tr>
<td>Seed fertilizers and chemicals</td>
<td>12,180</td>
<td>11,380</td>
<td>9,180</td>
</tr>
<tr>
<td>Labor cost</td>
<td>1,060</td>
<td>920</td>
<td>815</td>
</tr>
<tr>
<td>Harvesting costs</td>
<td>2800</td>
<td>2600</td>
<td>2450</td>
</tr>
<tr>
<td>Return to Capital</td>
<td>1,577</td>
<td>1,385</td>
<td>1,211</td>
</tr>
<tr>
<td>Land rent</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>Transport to Nairobi</td>
<td>120</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total production cost</strong></td>
<td><strong>27,137</strong></td>
<td><strong>24,635</strong></td>
<td><strong>22,006</strong></td>
</tr>
</tbody>
</table>

| Cost per bag (own land)     | 1,446     | 1,720   | 2,001           |
| Cost per bag (rented land)  | 1,696     | 2,053   | 2,445           |
| Profit margin per bag (own land) | 1,354 | 1,080 | 799 |
| Profit margin per bag (rented land) | 1,104 | 747 | 355 |

Wheat producers divided into 3 categories based on their efficiency scores, Least efficient mean acres =7.5, Average mean acres =25 acres, Efficient producers =150
• The efficient farmers’ **cost of production** per bag was 28% less than least efficient

• **Yields** for efficient producers was 78% higher compared to the least efficient farmers.

• **Profits** by efficient producers per bag was 55% more compared to least efficient farmers when producing on their own land.

• Where farmers were renting land the cost of production per bag **increase** by 17%, 19% and 22% while profit margin per bag **declined** by 16%, 26% and 44% for the efficient, average and least efficient farmers respectively.
Cost component in wheat production

- Production costs
  - Input costs highest about 44% of total costs
  - Highly mechanized about 29% of total cost
- Marketing costs
  - Transporters
    - Variable cost constituted 75% of total costs
    - Overall fuel contributed 69% of the total costs
  - Traders
    - Council cess payment 38% of total costs
    - Transport charges 29% of total costs
Cost build-up from farm gate to miller

- Production cost accounts for 56%, 68%, and 81% of the mill gate price
- Margin made 37%, 25% and traders 12%
### Competitiveness of domestically Produced Wheat

<table>
<thead>
<tr>
<th></th>
<th><strong>Landed price in Mombasa store</strong></th>
<th><strong>Landed price Nairobi (with 10% duty)</strong></th>
<th><strong>Landed price Nairobi without duty</strong></th>
<th><strong>Efficient</strong></th>
<th><strong>Average</strong></th>
<th><strong>Least</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ex Us gulf</strong></td>
<td>2,037</td>
<td>2,306</td>
<td>2,143</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>July 2010</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Domestic</strong></td>
<td></td>
<td></td>
<td></td>
<td>1,696</td>
<td>2,053</td>
<td>2,445</td>
</tr>
</tbody>
</table>

- 10% import duty
  - Only efficient and average producers are competitive
- Zero rated
  - Only efficient and average producer are competitive with average producer having a slight margin
- By end of September the price of ton of wheat was US$ 310 thus landed price Nairobi with duty 2,982 and 2,758 without duty
- All producers will be competitive at this price under the two scenarios
- These prices are short term (due to export ban in Russia).
Inefficiencies along the wheat value chain

- Production
  - **High cost of inputs** (seed, fertilizer and chemical) contributing to 44% of total cost of production
  - **Low yields**, only 50% of the farmers interviewed used purchased seed, **Over 21 varieties** have been released by KARI, farmer interviewed growing 6 varieties.
  - Kenya hero or yombi varieties -32 bag/acre cost will reduce 61% and at this price farmer would be competitive
  - Wheat farming require **mechanized operation** (30% of total production costs- **high cost of fuel**, old machinery frequent maintenance- **high cost of spare parts**
Transporters

- **high cost of fuel.** From the survey fuel cost constitute 69% of the total transport costs
- **Poor state of the roads** especially the roads connecting the farming communities to the markets
- **High maintaince costs**-due to the poor infrastructure and age of the lorries transporter do undertake frequent repairs on their vehicles
- **Roads blocks**- Delays in terms of time. Incurs bribe to pass through the road blocks

Traders

- **Multiple taxation**-payment of cess to various municipal council especially where wheat was transported through different municipalities.
- **High cost of transport**- as a result of high fuel prices, poor states of the roads
- **Unharmonized licenses charges**- by both local and central government
• RICE
## Cost of rice production at farm level

<table>
<thead>
<tr>
<th>Item</th>
<th>Least efficient</th>
<th>Average</th>
<th>Efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice Yields (50 kg bags)</td>
<td>20</td>
<td>25</td>
<td>33</td>
</tr>
<tr>
<td>Price/bag</td>
<td>4,400</td>
<td>4,400</td>
<td>4,400</td>
</tr>
<tr>
<td><strong>Gross output</strong></td>
<td><strong>88,000</strong></td>
<td><strong>110,000</strong></td>
<td><strong>145,200</strong></td>
</tr>
<tr>
<td><strong>Costs of production</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land preparation</td>
<td>4,300</td>
<td>4,200</td>
<td>4,300</td>
</tr>
<tr>
<td>Seeds, Fertilizers and chemicals</td>
<td>12,500</td>
<td>13,150</td>
<td>13,410</td>
</tr>
<tr>
<td>Labor costs</td>
<td>17,900</td>
<td>18,100</td>
<td>18,950</td>
</tr>
<tr>
<td>Rent</td>
<td>25,000</td>
<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Gunny bags</td>
<td>700</td>
<td>875</td>
<td>1,155</td>
</tr>
<tr>
<td>Transport from farm</td>
<td>1,000</td>
<td>1,250</td>
<td>1,650</td>
</tr>
<tr>
<td>Milling cost</td>
<td>2,000</td>
<td>2,500</td>
<td>3,300</td>
</tr>
<tr>
<td>Total cost</td>
<td>63,400</td>
<td>65,075</td>
<td>67,765</td>
</tr>
<tr>
<td>Overheads (10%) of total cost</td>
<td>6,340</td>
<td>6,508</td>
<td>6,777</td>
</tr>
<tr>
<td><strong>Total cost of production per acre</strong></td>
<td><strong>69,740</strong></td>
<td><strong>71,583</strong></td>
<td><strong>74,542</strong></td>
</tr>
<tr>
<td><strong>Revenue per acre</strong></td>
<td><strong>18,260</strong></td>
<td><strong>38,417</strong></td>
<td><strong>70,658</strong></td>
</tr>
<tr>
<td><strong>Cost per bag</strong></td>
<td><strong>3,487</strong></td>
<td><strong>2,863</strong></td>
<td><strong>2,259</strong></td>
</tr>
<tr>
<td><strong>Revenue per bag</strong></td>
<td><strong>913</strong></td>
<td><strong>1,537</strong></td>
<td><strong>2,141</strong></td>
</tr>
</tbody>
</table>

- Using MIAD input recommendation, paddy producer were categorized into three groups: least, average, and efficient producers.
- Efficient producers incurred 6% more cost per acre and got 33% higher yields compared to least efficient. 
- Cost of producing a bag of milled rice was 54% lower and profit per bag was 57% higher for efficient producers compared to least efficient.
Comparison of production cost of NERICA between Kenya and Uganda

- Upland rice cost of production lower than paddy rice by 55%
- Comparison of NERICA rice production in Kenya and Uganda
  - In both countries, yields were 30 bags/acre
  - Kenya cost of production per acre was 21% higher compared to Uganda
  - Revenue per bag in Kenya was 9% higher compared to Uganda
Marketing Costs

- Traders
  - highest costs incurred by traders was milling costs
  - In both margins made countries
    - in Kenya 68% and 67% for both small and large scale traders
    - In Uganda 8% for the small scale traders
- Millers
  - Labour was the highest cost incurred in Kenya (50%) while in Uganda it was electricity (82%)
  - Millers in Kenya incurred 143% more overhead costs compared to their counterparts in Uganda
Cost build up from farm-gate to consumer through traders

- Cost of production lowest for efficient 47% and highest for the least efficient 73%
- Efficient makes the highest margin 45% and while least efficient margin was 19%
Competitiveness of domestically produced rice

<table>
<thead>
<tr>
<th>Imported</th>
<th>Cost in Ksh.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pakistan rice</td>
<td>3,014</td>
</tr>
<tr>
<td>August 2010</td>
<td></td>
</tr>
<tr>
<td>Landed price in Mombasa store 50 kg bag</td>
<td>3,146</td>
</tr>
<tr>
<td>Landed price Nairobi (with 35% duty) 50 kg bag</td>
<td>2,445</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domestic</th>
<th>Efficient</th>
<th>Average</th>
<th>Inefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of producing 50 Kg bag</td>
<td>2,259</td>
<td>2,863</td>
<td>3,487</td>
</tr>
<tr>
<td>Transport to Nairobi 50kg bag</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Landed price Nairobi 50kg bag</td>
<td>2,299</td>
<td>2,903</td>
<td>3,527</td>
</tr>
</tbody>
</table>

- With a 35% import duty levied
  - only efficient and average farmers are competitive
- Zero rated
  - only the efficient farmers are competitive with a mark-up of 6%
- If we were considering duty import before the reduction from 75%
  - import rice with duty landing Nairobi would have been Ksh. 3,970
  - thus all farmers would be competitive
Inefficiencies along the rice Value chain

- Production
  - Paddy rice production is labor intensive as most activities are done manually (contributing to 56% of total costs)
  - Increase prevalence rate of water borne diseases (malaria and bilharzias) in the schemes has affected the availability of labor force which is critical as rice production is labor intensive
  - High input costs - farmers don’t use the recommended rate of application thus leading to low yields
  - Water rationing in schemes affecting production
  - Poor irrigation infrastructure requiring rehabilitation
• Traders
  • high cost of electricity-translating to high cost of milling
  • Labor use for drying-increase costs for trader this was common in Kenya

• Millers
  • high cost of electricity-high milling costs
  • Unutilized capacity-stiff competition many mills opened
  • High cost of maintenance-compound mills owned by millers (medium scale) were old. Thus broke down regularly interfering with operations as some of the spare parts were not easily sourced locally
Key Finding

- **Wheat**
  - High cost in producing wheat
  - Low wheat yields by producer about 1.98 tons/ha compared to Egypt 6 tons/ha
  - Inefficiencies along the value chain
  - Only efficient and average wheat producers are competitive at 10% import duty

- **Rice**
  - High cost of producing rice
  - High marketing costs especially milling
  - Inefficiencies along the value chain
  - Only efficient and average rice producer are competitive at 35% duty
Policy Options

- Inefficient wheat producers are uncompetitive they comprise of small scale farmers average acreage 7.5 who are majority
  - Increased investment in research and technology to develop high yielding and drought tolerant varieties
  - Promote for adoption by farmers high yielding varieties already developed –linkages between extension and research
- In long run if they don’t produce wheat efficiently they can diversify to other high value crops
- In marketing, harmonization of cess paid to local authority
- Investment in irrigation infrastructure
- Investing in fertilizer production at the national or regional level
Policy Option cont’d

- Inefficient rice producers are not competitive
  - Increase funding in research and technology to produce high yielding varieties
- Campaigns to eradicate water borne diseases in the schemes
- Adoption of simple technology from Asia to assist in paddy production - reduce costs of labor, pressure on availability
- In reducing marketing costs invest in alternative and cheap source of energy - solar, wind
- Investing in processing, branding and marketing activities in the rural rice growing to create employment opportunities
Thanks