How Profitable is the Private Sector Investment in Biofortification? A Case Study of Firms in Nigeria

Presenter:– Ayodeji Ogunleye
Biofortification of commonly consumed staples is an urgently needed intervention to overcome Vitamin A deficiency (VAD) in Nigeria.

HarvestPlus Nigeria has intensified efforts to attract more private sector investments into vitamin A cassava value chain since 2015.

One of the barriers to the uptake of this new technology by the private sector is lack of empirical knowledge about return on investment.
Study objectives

- Broadly: To attract more private sector investment in Vitamin A cassava value chain.

- Specifically: Examine the integration of biofortified vitamin A cassava among investors and level of investments in cassava value chain.

- Analyze net profit by each sub-sector and by level of investment.

- Compare the profitability of vitamin A yellow cassava products with white cassava.
Vitamin A cassava value chain

- **Stem/tuber producing Businesses (Node 1)**

- **Bulking Agents**

- **Processing Businesses (Node 2)**
  - Gari processors
  - Fufu processors
  - HQCF processors
  - Caterers – confectioneries

- **Seed**

- **Processed Food**

- **Commercial**
  - Micro scale
  - Large scale
  - Medium scale

- **Public**
  - Government
  - NGOs & CBOs

- **Household**
  - Individual
  - Group

- **Consumers (Node 4)**

- **Point of Sale Businesses, Restaurants and Online Businesses (Agroshop.com.ng) (Node 3)**
DATA COLLECTION METHOD

Survey questionnaire:
- Stem & Tubers
- Processors
- Value Addition
- Marketers

Visual observation:
- Processors
- Value Addition
Result:- Market share for all products by business type

- Stem/tuber producers: 54%
- Gari processors: 30%
- Fufu processors: 8%
- HQCF processors: 2%
- Caterers (Confectioneries): 2%
- Restaurant operators: 2%
- Point of Sale (POS) operators: 1%
Results:- Share of vitamin A cassava in total cassava trade volume by scale of investment

- Micro: 55% White cassava, 45% Vitamin A cassava
- Small: 41% White cassava, 59% Vitamin A cassava
- Medium: 33% White cassava, 67% Vitamin A cassava
- Large: 27% White cassava, 73% Vitamin A cassava
## Mean Costs by Scale of Investment (‘000 Naira)

<table>
<thead>
<tr>
<th></th>
<th>Micro</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
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</thead>
<tbody>
<tr>
<td><strong>A. Fixed cost item</strong></td>
<td></td>
<td></td>
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<tr>
<td>Building/Trading Space</td>
<td>5.2±9.5</td>
<td>14.4±15.8</td>
<td>52.6±77.4</td>
<td>198.0±170.6</td>
</tr>
<tr>
<td>Machinery/Equipment</td>
<td>3.2±10.5</td>
<td>6.0±14.1</td>
<td>104.1±183.6</td>
<td>405.8±242.6</td>
</tr>
<tr>
<td>Total Fixed Cost*</td>
<td>6.7±14.2</td>
<td>17.1±23.6</td>
<td>148.0±222.1</td>
<td>603.7±356.3</td>
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<tr>
<td><strong>B. Variable cost item</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw material</td>
<td>23±19</td>
<td>61±72</td>
<td>178±278</td>
<td>1110±650</td>
</tr>
<tr>
<td>Other costs</td>
<td>37±15</td>
<td>71±32</td>
<td>543±230</td>
<td>2635±1007</td>
</tr>
<tr>
<td>Total Variable Cost</td>
<td>58±45</td>
<td>132±94</td>
<td>721±379</td>
<td>3745±2966</td>
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Share of cash and non-cash revenue in total revenue

<table>
<thead>
<tr>
<th></th>
<th>Cash Revenue</th>
<th>Non-Cash Revenue</th>
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<tbody>
<tr>
<td>Micro</td>
<td>85%</td>
<td>15%</td>
</tr>
<tr>
<td>Small</td>
<td>88%</td>
<td>11%</td>
</tr>
<tr>
<td>Medium</td>
<td>98%</td>
<td>2%</td>
</tr>
<tr>
<td>Large</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>
GPM and ROI from running Vitamin A Cassava Businesses by scale of investment

<table>
<thead>
<tr>
<th></th>
<th>Micro</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPM</td>
<td>30%</td>
<td>52%</td>
<td>59%</td>
<td>59%</td>
</tr>
<tr>
<td>ROI</td>
<td>190%</td>
<td>142%</td>
<td>79%</td>
<td>161%</td>
</tr>
</tbody>
</table>
Average GPM and ROI from running Vitamin A Cassava Processing Businesses

- Stem/tuber producers (n = 41) – 12 months
- Gari processors (n = 44) – 3 months
- Fufu processors (n = 19) – 3 months
- HQCF processors (n = 3) – 3 months
- Caterers (Confectioneries) (n = 7) – 3 months
- Restaurant operators (n = 8) – 3 months
- Point of Sale (POS) operators (n = 8) – 3 months
### Profitability (GPM) of vitamin A cassava businesses compared with that of white cassava businesses

<table>
<thead>
<tr>
<th>Source of evidence</th>
<th>White cassava</th>
<th>Vitamin A cassava</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Literature</td>
<td>HarvestPlus/OAU 2015 survey</td>
</tr>
<tr>
<td>No. of studies (obs.)*</td>
<td>15 (a=10, b=8)</td>
<td>130 (a=41, b=73)</td>
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<tr>
<td>No. of states (All)</td>
<td>11</td>
<td>3</td>
</tr>
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<table>
<thead>
<tr>
<th></th>
<th>Mean White</th>
<th>Range</th>
<th>Mean Vitamin A</th>
<th>Range</th>
<th>Diff in means</th>
</tr>
</thead>
<tbody>
<tr>
<td>a: Stem/tuber production</td>
<td>60.93%</td>
<td>42.5% - 76.0%</td>
<td>33.10%</td>
<td>-135.2% - 82.5%</td>
<td>-27.83%</td>
</tr>
<tr>
<td>b: Cassava processing</td>
<td>43.84%</td>
<td>20.9% - 85.7%</td>
<td>52.49%</td>
<td>-63.08% - 80.4%</td>
<td>5.25%</td>
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Conclusion

- Investment in biofortified cassava VC is profitable and the profit level increases with scale of investment.

- There is high level of integration of biofortified cassava among investors because the profit level is 9% higher than white cassava.

- The most profitable (GRM) business are fufu (56%), HQCF (55%) and gari (53%), while the least are stem/tuber (30%) and POS (33%).

- Inefficiency level Is highest (31%) within the Stem and tuber businesses and 94% of all inefficient firms are micro and small scale businesses.
Recommendations

- Training and re-training of farmers and processors who are operating inefficiently to maintain high dry matter content.
- Improve supply-side of the market in order to boost the business opportunity on the supply-side of the vitamin A cassava market in Nigeria.
- For sustainability, stem and tuber production more need investors via incentives, access to loan, simplify loan procedures, etc.