TANZANIA
Country Overview
Tanzania —PESTEL Analysis

Political
- President Magufuli elected in 2015 (5 year term) on a platform of clampdown on corruption, strengthen tax admin and manage public resources for improved social outcomes-71% approval of this
- The transition has caused uncertainty with Private sector from unpredictability of policy actions (targeting revenue collection and stamping out corrupt practices) resulting in delays in investment decisions.
- Development agenda (ADSP2—launched 2018) to bring reform to small scale farmers, increase their revenue, and food security. Programs may crowd out or limit private sector that can help with technology improvements.
- Large infrastructure program undertaken—rail and port upgrades

Economic
- GDP growth of 7.1% in 2017
- GDP=US$52 Bill, Agriculture contributes 29% of GDP, 85% of exports and engages 65% of population. Strong reliance leaves it vulnerable to weather commodity price shocks.
- Low fiscal deficit (18.6%), low execution of development budget and high level of Govt payment
- Large investments in infrastructure expected to impact on currency

Social
- Modest poverty reduction from 28 to 27% largely in urban areas.
- Improvements in Human develop index attributed to improvements in health and education.
- Expanded access to free secondary education.

Technical
- Limited use of crop/soil specific fertilizers. No blenders.
- Holistic development programs being undertaken by donor partners, private sector and public sector in SAGCOT.
- Low technical capacity in the public sector.

Environment
- Major cities suffer from pollution
- Deforestation, for charcoal manufacture, overgrazing and soil degradation form poor crop production are significant issues.
- An estimated 4.7 Mil ha of cropping lands are effected by acidity

Legal
- Significant review of mining laws and existing State/Investor Agreements
- Restrictions on media reporting
- Restrictions on social media use
- Restrictions on Freedom of expression- criticism of Government

Key Takeaways
- Uncertainty surrounding policy changes has caused investment uncertainty
- The country is focusing on increasing value addition in the agricultural sector
- Restrictions on freedom of expression has caused fear in many sectors.
**Importance of Agriculture in Tanzania**

65% of the 53Mill population reliant on agriculture. Contributes 29% of GDP-forecast to grow to 40%-Vision 2025

**Tanzania Agriculture Metrics**

44.5 Mill ha of Arable land
11 mill Ha under cultivation. (2.7 Mill permanent cultivation, 8 mill long rain, 4.3 short rains (53% of cropping land is double cropped))

Source: (2016/17 Annual Agricultural Sample Survey- United Republic of Tanzania)

**Farmer Demographics**

8.4 Mill operators (of which 85% is SHF) directly involved in growing crops
- 85% of land is farmed by SHF (0.9 to 3Ha average farm size-2 Ha)

- Agriculture is part of their identity
  - Pride, legacy for future, opportunity to be successful
  - Rely on Agric for sustainance, income and investment.

- Aging base—few young people

- Good understanding of uncertainty, risk and risk mitigation surrounding Agriculture—risky practices run counter to their desires.
  - 40% typically not enough money for Food
  - 40% have enough for food(that is not available) and clothes
  - Often fall below the poverty line
  - Are mainly subsistence
  - 85% are food crops—predominantly staples—less than 1% are cash crops
  - The small amount they do sell is subject to thin markets-shocks and competition

Source: 2016/17 AASS .

CGAP working Paper—“National Survey and Segmentation of Small Holder Households in Tanzania” 2016

**Factors impacting on yield improvement and profit maximization**

- Access to balanced fertilizers.
- Access to Lime for pH adjustment.
- Ability to buy inputs (seed and fertilizer—cash/credit.
- Access to knowledge—poor networks and extension capacity.
- Environmental stress-weather and pests-risk mitigation
- Access to markets-poor roads, delayed payments from NFRA
- Low prices-Associated with selling time, inconsistent offtake from NFRA, over supply from Neighbouring countries in good years.
- Access to post harvest storage

Fertilizer use is dependent on acceptable ROI at the farm level

Source: CGAP working Paper : personal experience

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**High National participation and dependence on Agriculture**

**Predominantly Small holder farmers with a focus on risk mitigation and production of sustenance crops**

**Poor access to many components for productivity improvement**
Fertilizer in Tanzania
Growth in Tanzania’s fertilizer consumption mirrors increase in land cultivated

Key Takeaways
- Fertilizer use has mirrored area harvested rather than increasing rates to support productivity gains
Key characteristics of the Tanzanian fertilizer market

The Tanzanian market has the following key characteristics:

• The majority of non estate fertilizer is delivered to SHF through a “Hub and Spoke” (agro-dealer/village agent) distribution system.

• Tanzania has largely (97%) been an importer of finished product-commodities (DAP, urea, Ammonium Sulphate, CAN) and NPK compounds. To date there is no physical blending of fertilizers in country although Minjingu blend multi-nutrient products and granulate and Yara and ETG import multi-nutrient products for specific crops. Changes to regulations in 2017 that allowed a more market-responsive approach to blend formulations
  - No validation of blends required.
  - One season evaluation for new products

• 4.7 million ha have pH <5.6. This is likely having a significant regional impact on productivity and fertilizer use efficiency. Acidity leads to land degradation and a reduction in nutrient use efficiency from fertilizers of up to 50%. Need to develop a Liming strategy to correct soil acidity.

• Introduction of the Bulk Procurement System (BPS). From mid-2017, import of major commodities (DAP and urea) has been undertaken by TFRA tender arrangement.
  - Pricing of these major commodities is controlled at all points of the value chain.
  - This has impacted traditional market importers and distributors as these products made up 59% of the product imported. The distribution channel has been severely disrupted.
  - It is unclear how the fixed pricing will impact on blend development and investment in blending.

• Government-to-government agreement between Morocco (OCP) and Tanzania sees support given to
  - soil testing and blend formulation research
  - joint project with Tanzania Fertilizer Company (TFC) to provide consignment stock and utilize TFC storage facilities.
  - a proposal to build a blending plant in 2019

• The market has predominantly used DAP and urea with limited numbers of compounds and no blends because of the registration requirements.

• A number of importers and manufacturers have placed on hold development plans until a clear direction is understood with BPS.

• Increase in productivity (cereals) over the last 40 years (Figure 3) is marginal.

• Significant market disruptors and public sector controls over the SHF sector exist. –NFRA offtake restrictions, and closure of borders for regional trade have impacted on farmer profitability at times.

• Minjingu is seeking greater role in supply of domestically manufactured product into the BPS.

• TFRA is the sole regulatory body responsible for all aspects pertaining to fertilizer, including management of the BPS. “One stop shop” for fertilizer issues

• Private sector and donor programs in the SAGCOT region have linked components of inputs, credit, lime, offtake linkages successfully to make profit the focus, rather than cost reduction.

• SAGCOT has played a key role in attracting value chain investment and bringing partners together in clusters which have increased farmer productivity/profitability. The role of SAGCOT is being expanded across the country
Tanzanian Fertilizer Market – Product Use

**Tanzania Fertilizer consumption by Product 2017**

<table>
<thead>
<tr>
<th>Product</th>
<th>2017 Apparent Consumption (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea</td>
<td>120627</td>
</tr>
<tr>
<td>NPK</td>
<td>71903</td>
</tr>
<tr>
<td>DAP</td>
<td>56188</td>
</tr>
<tr>
<td>CAN</td>
<td>49450</td>
</tr>
<tr>
<td>Ammonium sulphate</td>
<td>39222</td>
</tr>
<tr>
<td>TSP</td>
<td>2954</td>
</tr>
<tr>
<td>Calcium nitrate</td>
<td>2816</td>
</tr>
<tr>
<td>Phosphate rock</td>
<td>2531</td>
</tr>
<tr>
<td>MOP</td>
<td>1652</td>
</tr>
<tr>
<td>Potassium nitrate</td>
<td>899</td>
</tr>
<tr>
<td>PK compounds</td>
<td>502</td>
</tr>
<tr>
<td>Organic Fertilizers</td>
<td>324</td>
</tr>
<tr>
<td>MAP</td>
<td>209</td>
</tr>
<tr>
<td>SOP</td>
<td>207</td>
</tr>
<tr>
<td>Other N fertilizers</td>
<td>3</td>
</tr>
<tr>
<td>NK compounds</td>
<td>3</td>
</tr>
<tr>
<td>NP compounds</td>
<td>-525</td>
</tr>
<tr>
<td>Total</td>
<td>349491</td>
</tr>
</tbody>
</table>

Source: The AFO hosted Fertilizer Technical Working Group

*Tanzania is largely (97%) an importer of finished product-commodities (DAP, urea, Ammonium Sulphate, CAN) and NPK compounds. To date there is no physical blending of fertilizers in country although Minjingu blend multi-nutrient products and granulate.*

**Tanzania Fertilizer use by crop-2017**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Hectares Planted</th>
<th>Hectares fertilized Ha</th>
<th>Tons fertilizer consumed (mt)</th>
<th>Average fertilizer use per Ha planted (kg/Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>3,817,900</td>
<td>1,493,961</td>
<td>182,913</td>
<td>48</td>
</tr>
<tr>
<td>Paddy (Rice)</td>
<td>1,097,300</td>
<td>286,252</td>
<td>41,956</td>
<td>38</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>43,780</td>
<td>31,407</td>
<td>7,950</td>
<td>182</td>
</tr>
<tr>
<td>Tea</td>
<td>22,720</td>
<td>54,532</td>
<td>2,509</td>
<td>110</td>
</tr>
<tr>
<td>Coffee</td>
<td>231,400</td>
<td>129,332</td>
<td>21,733</td>
<td>94</td>
</tr>
<tr>
<td>Tobacco (flue cured)</td>
<td>38,112</td>
<td>62,250</td>
<td>6,105</td>
<td>160</td>
</tr>
<tr>
<td>Tobacco (fire cured)</td>
<td>9,528</td>
<td>31,871</td>
<td>2,195</td>
<td>230</td>
</tr>
<tr>
<td>Roots &amp; Tubers</td>
<td>2,101,000</td>
<td>1,004,826</td>
<td>26,850</td>
<td>13</td>
</tr>
<tr>
<td>Legumes</td>
<td>1,555,490</td>
<td>507,391</td>
<td>33,367</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>8,917,230</td>
<td>3,601,822</td>
<td>325,578</td>
<td>37</td>
</tr>
</tbody>
</table>

Source: AFO.. Fertilizer use by crop study 2018

Maize and Rice are the major users of fertilizer by volume, but the cash crops have the highest use rates per hectare, perhaps indicating a preparedness to use higher volumes when market risk is mitigated.
Maize

Maize yields/ha (efficient utilization of land area) have kept constant at between 1 and 1.5 tons per ha over the last 15 years. Total maize production in Tanzania has trebled in the last 30 years. This growth has been achieved through increasing land cultivation.

Rice

Productivity in the Rice sector has made gains in the last 10 years increasing yields by 30%. Major gains in production have been achieved increasing area cultivated area.

Key takeaways:
- Low productivity and improvements in crop intensification over the last 20 years
- Production increases achieved through expansion of cultivated land. Sustainability concerns
### Tanzanian Fertilizer Market-Individual Product Use by Crop and Products Registered

#### Fertilizer product use by Crop

<table>
<thead>
<tr>
<th>Crop</th>
<th>Types of Fertilizer Applied</th>
<th>Volumes of Fertilizer Applied (tons)</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maize</strong></td>
<td>DAP 23-21-0 v5 , Mg, Zn</td>
<td>20,962</td>
<td>23,745</td>
<td>50,278</td>
<td>42,141</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAN</td>
<td>2,381</td>
<td>4,147</td>
<td>7,860</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TSP</td>
<td>-</td>
<td>5,906</td>
<td>10,239</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urea</td>
<td>90,937</td>
<td>58,662</td>
<td>93,552</td>
<td>88,057</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ammonium sulfate</td>
<td>14,724</td>
<td>-</td>
<td>20,836</td>
<td>19,611</td>
<td></td>
</tr>
<tr>
<td><strong>Rice</strong></td>
<td>DAP 23-21-0 v5 , Mg, Zn</td>
<td>5,123</td>
<td>7,305</td>
<td>14,158</td>
<td>11,238</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAN</td>
<td>-</td>
<td>-</td>
<td>2,815</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TSP</td>
<td>-</td>
<td>109</td>
<td>149</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urea</td>
<td>12,957</td>
<td>16,072</td>
<td>24,493</td>
<td>24,125</td>
<td></td>
</tr>
<tr>
<td><strong>Pulses (Beans, Cowpeas, etc)</strong></td>
<td>DAP 23-21-0 v5 , Mg, Zn</td>
<td>23,096</td>
<td>17,004</td>
<td>3,334</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ammonium nitrate</td>
<td>12,783</td>
<td>11,173</td>
<td>17,000</td>
<td>15,355</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAN</td>
<td>-</td>
<td>-</td>
<td>8,450</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TSP</td>
<td>-</td>
<td>200</td>
<td>200</td>
<td>850</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other cereals (millet, sorghum, wheat and barley) &amp; oil seeds</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maize</td>
<td>550</td>
<td>350</td>
<td>200</td>
<td>2,413</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coffee</td>
<td>13,833</td>
<td>10,020</td>
<td>8,875</td>
<td>42,310</td>
<td></td>
</tr>
<tr>
<td><strong>Sugar cane</strong></td>
<td>DAP 23-21-0 v5 , Mg, Zn</td>
<td>4,531</td>
<td>5,943</td>
<td>3,539</td>
<td>2,809</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ammonium sulfate</td>
<td>14,919</td>
<td>11,811</td>
<td>13,248</td>
<td>19,611</td>
<td></td>
</tr>
<tr>
<td><strong>Coffee</strong></td>
<td>DAP 23-21-0 v5 , Mg, Zn</td>
<td>1,065</td>
<td>3,970</td>
<td>16,704</td>
<td>19,780</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ammonium sulfate</td>
<td>3,746</td>
<td>10,953</td>
<td>1,507</td>
<td>7,233</td>
<td></td>
</tr>
<tr>
<td><strong>Roots &amp; Tubers (potatoes and cassava)</strong></td>
<td>DAP 23-21-0 v5 , Mg, Zn</td>
<td>5,933</td>
<td>5,929</td>
<td>5,393</td>
<td>2,412</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ammonium sulfate</td>
<td>2,089</td>
<td>2,397</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAN</td>
<td>7,456</td>
<td>7,002</td>
<td>6,435</td>
<td>14,314</td>
<td></td>
</tr>
<tr>
<td><strong>Vegetables and Horticulture</strong></td>
<td>DAP 23-21-0 v5 , Mg, Zn</td>
<td>12,740</td>
<td>2,000</td>
<td></td>
<td>1,986</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAN</td>
<td>326</td>
<td>3,000</td>
<td>966</td>
<td>1,585</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TSP</td>
<td>1,511</td>
<td>163</td>
<td></td>
<td>80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ammonium sulfate</td>
<td>3,407</td>
<td>153</td>
<td>108</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAN</td>
<td>11,793</td>
<td>18,535</td>
<td>2,321</td>
<td>2,941</td>
<td></td>
</tr>
<tr>
<td><strong>Other cereals (millet, sorghum, wheat and barley)</strong> &amp; oil seeds</td>
<td>DAP 23-21-0 v5 , Mg, Zn</td>
<td>6,593</td>
<td>512</td>
<td>725</td>
<td>830</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAN</td>
<td>49</td>
<td>3,210</td>
<td>1,078</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TSP</td>
<td>457</td>
<td>54</td>
<td>127</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ammonium sulfate</td>
<td>1,646</td>
<td>10</td>
<td>50</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAN</td>
<td>13,840</td>
<td>10,191</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tea</strong></td>
<td>DAP 23-21-0 v5 , Mg, Zn</td>
<td>4,710</td>
<td>4,550</td>
<td>4,540</td>
<td>6,100</td>
<td></td>
</tr>
</tbody>
</table>

| Grand Total              |                      | 308,120                             | 249,389     | 330,880     | 349,491     |

Source: 2017 AFO FUBC report

Maize production consumes 56% of the fertilizer used in Tanzania (2017). Average consumption rate of 48kg/ha harvested area. Rice consumes 12% of total fertilizer use with an average consumption rate of 38kg/ha.

All Multi-nutrient fertilizers registered are granulated compounds—Blending has not started in Tanzania yet.

### Compound Fertilizer Products registered in Tanzania

#### Formulation

<table>
<thead>
<tr>
<th>Yara compound fertilizers</th>
<th>Trade brand</th>
<th>Main use</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPK 22-06-12 +2CaO, +1MgO, +3S, +0.2B +0.22Zn</td>
<td>Java</td>
<td>Coffee and tea</td>
</tr>
<tr>
<td>NPK 23-10-5 +2 MgO +3 S +0.3 Zn</td>
<td>Cereals</td>
<td>Cereals</td>
</tr>
<tr>
<td>NPK 15-5-20 +1.8 MgO +9.5 SOD +0.015 B +0.02 Mn +0.02 Zn</td>
<td>Winner</td>
<td>Fruits and vegetables</td>
</tr>
<tr>
<td>NPK 12-24-12 + 5S +2MgO + 0.2Fe + 0.007Zn</td>
<td>Otsela</td>
<td>Rice</td>
</tr>
<tr>
<td>NPK 17-17-17</td>
<td>-</td>
<td>Coffee, maize, melon, rice, vegetables</td>
</tr>
<tr>
<td>NPK 10-18-24 +3CaO +0.5MgO +7S +0.012B</td>
<td>Tobacco</td>
<td>Tobacco</td>
</tr>
<tr>
<td>NPK 40-0-0 +5.5S</td>
<td>-</td>
<td>Amidas</td>
</tr>
<tr>
<td>NPK 40-0-0 +5+7CaO</td>
<td>-</td>
<td>Sulfan</td>
</tr>
<tr>
<td>NPK 15.5-0-0 +26.3CaO</td>
<td>Calcium nitrate</td>
<td>Topdress; fruits and vegetables</td>
</tr>
<tr>
<td>NPK 15.4-0-0 +25.9CaO +0.3B</td>
<td>-</td>
<td>Nitrabor</td>
</tr>
<tr>
<td>NPK 5-7.5-5 +5S +5Zn +5B +0.1Cu +0.1Fe +0.1Mn +0.1Mo</td>
<td>Tracel BZ</td>
<td>B and Zn foliar; multiple crops</td>
</tr>
<tr>
<td>NPK 0-44-7.5 +6.6MgO +4.6Zn</td>
<td>Cereal Boost P and K foliar; cereal crops</td>
<td></td>
</tr>
</tbody>
</table>

#### Minjingu compound fertilizers

<table>
<thead>
<tr>
<th>Minjingu compound fertilizers</th>
<th>Trade brand</th>
<th>Main use</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPK 10-20-0 +25CaO +1.5MgO +5S +0.5Zn +0.1B</td>
<td>Minjingu Mazao</td>
<td>Maize; phosphate rock based</td>
</tr>
<tr>
<td>NPK 2-0-9 +38CaO +2.5MgO</td>
<td>Phosphate rock</td>
<td>Multiple crop and tree soil conditioner</td>
</tr>
<tr>
<td>NPK 9-16-6 +25CaO +2MgO +5S +0.5Zn +0.1B</td>
<td>NAFAKA Plus</td>
<td>Rice, coffee, tobacco, and sugarcane</td>
</tr>
<tr>
<td>NPK 26-10-0 +15CaO</td>
<td>Minjingu topdress</td>
<td>Topdress formulation (urea+PR)</td>
</tr>
</tbody>
</table>

Source: 2018 IFDC/AFAP report
Tanzania Fertilizer Market Structure--2017

Takeaways

- The majority of fertilizers delivered to SHF is through "Hub and Spoke" Agro-dealers
- Training is provided by Importer/distributors to the Hub and Spoke dealers
- The number of agro-dealers has declined significantly over the last 4 years due to profit constraints

Source:- compiled by author from Industry data and AASS 2016/17
Fertilizer Cost Chain Build up through the Port of Dar es Salaam

<table>
<thead>
<tr>
<th>Activity</th>
<th>Unit Cost in USD per MT</th>
<th>Unit Cost US$/50kg Bag</th>
<th>Unit Cost TZS/50kg Bag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import Cost Insurance and Freight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price of Urea AG (FOB)†</td>
<td>235</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freight</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marine Insurance [1% FOB]</td>
<td>3.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIF</td>
<td>277.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port Charges</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wharfage (1.6% CIF)*</td>
<td>4.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stevedoring*</td>
<td>6.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shorehandling*</td>
<td>6.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trimming, Weighing, Terminal Storage, Bagging, In/Out terminal handling**</td>
<td>18.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clearance &amp; Agency Fee†*</td>
<td>1.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPA Corridor Levy</td>
<td>0.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAT on Port Charges</td>
<td>2.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub total Port Charges</td>
<td>39.37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total landed cost</td>
<td>316.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warehousing costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport to warehouse**</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warehousing rent/2 months*</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAT on Warehousing services</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub total warehousing costs</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cost into Warehouse/FOT ex-Dar es Salaam</td>
<td>340.72</td>
<td>17.04</td>
<td>3867.145</td>
</tr>
</tbody>
</table>

Transportation costs to major centers in Tanzania

<table>
<thead>
<tr>
<th>Activity</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Durban</td>
</tr>
<tr>
<td>Road freight to Morogoro (1313km)</td>
<td>30.00</td>
</tr>
<tr>
<td>Road freight to Mbeya (829km)</td>
<td>40.00</td>
</tr>
<tr>
<td>Road freight to Songea (1059km)</td>
<td>50.00</td>
</tr>
<tr>
<td>Exchange Rate used $1=</td>
<td>22.70</td>
</tr>
<tr>
<td>Number of 50 Kg Bags in 1 ton</td>
<td>20</td>
</tr>
</tbody>
</table>

Port costs through Dar Es Salaam are relatively low for East Africa. These figures do not take into account demurrage which is normally costed in at US$5-10/ton.

Logistics
Dar Es Salaam Port
Import point for fertilizers or Rwanda, Burundi, DRC and Northern Zambia
- Congested and often ships incur demurrage.
- Discharge rates for bagging at quayside are low –on average 1000 to 1500t/day, compared to bulk discharge of 4 to 6000t/day. Two operators have bulk discharge capacity at the port.
- BPS has achieved priority discharge for its vessels
- Tanzanian Govt has eliminated VAT on all fertilizer activities

Other logistical Comments
- Road infrastructure poor.

<table>
<thead>
<tr>
<th>Fertilizer costs across Ports in East Africa (USD/Ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
</tr>
<tr>
<td>Port Charges</td>
</tr>
<tr>
<td>Bagging</td>
</tr>
<tr>
<td>Warehousing</td>
</tr>
<tr>
<td>Total costs ex warehouse</td>
</tr>
</tbody>
</table>

Source: AFAP/IFDC Port costs 2018

Key for Bulk Imports
The costs outlined here are indicative and not considerate of BPS. Refer to source document.
Average Urea Retail Prices (Oct ‘17) in selected countries

- Tanzania has relatively competitive prices

Map showing average urea retail prices in selected countries, with prices ranging from $401 to $914 per metric ton (US$/MT) and ratio to world price from 1.5 to >2.74.
Crop Prices: History and In-Country Ranges

Observations & Comments:
- The range of prices within country is large.
  - This indicates that profitability may also vary greatly by geography.
- The price range does appear to have narrowed over time. Narrowing would be expected if transport infrastructure had improved, thus better linking the various marketplaces.
Observations & Comments:

- Maize prices appear to have de-linked from urea prices in the past few years.
- Rice price correlation with urea also appears to have weakened, but not as strongly as maize.
Average Crop Prices in international markets

Observations & Comments:
• Maize and Rice prices were trending downwards since 2014
• 2017 appeared to have bucked the trend
• Excluding the 1st half of 2017 when there was a sharp increase, local maize prices have been steady
• Local rice prices have nudged upwards since 2014
Tanzanian Value Chain SWOT analysis

<table>
<thead>
<tr>
<th></th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manufacturer</strong></td>
<td>• Has gas availability— inability to allocate gas for fertilizer production</td>
<td>• Phosphate resource has some limitations for Wet Acid production</td>
<td>• The proposed Fauji/GoT urea plant has been cancelled— inability to reach agreement on Gas price. Is scale production an option?</td>
<td>• Fall back to rely on public sector capacity</td>
</tr>
<tr>
<td></td>
<td>• Has Phosphate resource— some production issues</td>
<td>• Lack of investment confidence</td>
<td>• There is some discussion from GoT to revisit support for Minjingu manufacture for domestic needs</td>
<td>• BPS will limit many importers appetite to invest in market development/participation</td>
</tr>
<tr>
<td><strong>Importer</strong></td>
<td>• Historically development of different distribution channels— ETG to develop container shops, Yara to provide agro-dealer development. “wait and see”</td>
<td>• Lack of confidence in investment because of BPS and failure of Govt to pay for participation in subsidy programs from 4 years back</td>
<td>• Develop competitive markets, supporting all players in an agreed development process.</td>
<td>• BPS will limit many importers appetite to invest in market development/participation</td>
</tr>
<tr>
<td></td>
<td>• OCP have entered market with GoT to GoM support</td>
<td>• Lack of clear role for actors</td>
<td>• Lever of the success of SAGCOT who has acted as a private/public platform.</td>
<td>• Unclear position with Minjingu</td>
</tr>
<tr>
<td><strong>Blender</strong></td>
<td>• No blenders in Tz. OCP proposing to build one</td>
<td>• Public sector need to make decisions on formulations for SHF</td>
<td>• Develop a platform that allow domestic ownership, but builds understanding of technologies and processes needed to implement and deliver required outcomes</td>
<td>• Continued direction from inexperienced people</td>
</tr>
<tr>
<td></td>
<td>• Limited appetite to invest with current governance</td>
<td>• Limited understanding of crop and soil nutrient levels and ability to make formulations.</td>
<td></td>
<td>• Unclear position with Minjingu</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Poor understanding of fertilizer types and technologies available</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Distributor</strong></td>
<td>• Dependant on BPS</td>
<td>• The role of both Hubs and agro-dealers have been impacted by decisions of the govt in payment of subsidy arrears and BPS.</td>
<td>• Better role for village and cooperative actors in distribution.</td>
<td></td>
</tr>
<tr>
<td><strong>Agro Dealer</strong></td>
<td>• Variable role— from village promoter to cooperative seller—a village representation</td>
<td>• Role under BPS is unclear because of financial constraints</td>
<td>• They play a significant role in programs like NAFAKA, Farm To Markets, in providing follow up from Village demonstrations.</td>
<td>• BPS</td>
</tr>
</tbody>
</table>

**Key Takeaways:**
1. It is unclear what direction Tz importers will take. Many are on a “wait and see” until BPS direction is more clearly understood.
2. Building distribution channels under government fixed pricing models needs careful evaluation
3. There needs to be re-focus on farmer profitability, not just lowest cost, which includes credit, offtake markets, pH correction, crop management.
4. Government institutions need support to define and implement programs that can develop “best bets” as a first step in adopting balanced nutrition
5. Governments need support to work with private sector to catalyse this action.
6. Recognition of the key role SAGCOT has played in building productivity and private sector bridging in Tz
7. Need to support Tz actors with knowledge on new technologies
**Status**

There is significant Regulatory discretion built into the 2009 Fertilizer Act which has seen significant change since 2016 in adapting to the market needs.

- Removal of all taxes and fees charged on fertilizer
- TFRA “one stop shop” for all fertilizer issues (product registrations, product quality, product exports and imports). This is a unique role in the region
  - Fertilizer products are now registered once, not once a year
  - Registration of fertilizer dealers is once
  - New fertilizer products only require one season of testing—reduced cost from $30k to $10k for field testing.
  - Validation of blends does not require infield testing.
- Management of the Bulk Procurement Scheme (BPS) by TFRA
  - The GoT has supported subsidy schemes of many different structures between 2003 and 2016. Most have experienced disruptive outcomes or control issues that have seen them stopped. The GoT introduced the Bulk Procurement Regulation in 2017 to benefit from aggregation of demand and import processes (copy of the BPS for Fuel in Tanzania)

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**Outcomes/weaknesses**

- Greater flexibility introduced in product use—in line with global practice and aim to encourage blended fertilizers.
- TFRA is a young organization whose capacity needs to be increased to cope with expanded roles.
  - The transition from commodity use to multi-nutrient blending/compounding is not well supported with capacity.
  - The monitoring and control of quality needs strengthening.
- BPS—An area of significant frustration. TFRA sets margins at all activity points-port, importer, transport, storage, agro dealers and set a town selling price
  - Difficulties setting average pricing for transport routes with poor roads and low volume transport.
  - Inadequate margins at hub and agro dealer level have seen collapse in the distribution system.
  - Low margins inadequate for private sector to build user capacity with trainings
  - Fixed user prices difficult to deal with in fluctuating global markets.
  - Significant shift in product away from the BPS products of DAP/Urea
  - Tendering limits manufacturers who can participate and potentially invest in the market.
- Possible areas of conflict when TFRA takes on the role of regulator and negotiator of tenders of product in BPS
- The above concerns have seen a disruption to the distribution channel with many existing dealers exiting because of no profit incentive. Most larger companies have put on hold development/investment plans until they see what direction BPS will take. There is a lack of confidence in the current climate.

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**Key Takeaways**

- Uncertainty surrounding policy and regulatory changes
- Uncertainty over BPS-impact on investment
Supply issues

- Supply was disrupted in 2017 due to BPS related issues: timely supply and channel migration because of low margins and unpaid subsidy debt. An estimated 60% of agro-dealers left the business over the last 4 years from unpaid debts accumulated from the subsidy schemes and this year from unprofitable margins in the distribution channel. This has impacted supply at the farm gate level.

- Poor infrastructure exists in many areas: distribution Kigoma and Kagera, and poor roads in many areas. Impacts on both access to market and supply of inputs.

- Border closure to maize trade impacts farmer cash flow.

- Compounds (outside BPS) were substituted for DAP due to DAP unavailability.

Demand issues

- Poor access to cash availability at small holder farmer level.

- Low input credit.

- Low knowledge of product use.

- Limited knowledge of fertilizer technologies and marketing practices in the value chain.

- The impact of soil acidity on fertilizer nutrient efficiency use is likely a significant contributor to suppressed fertilizer demand.

Key Takeaways

- Poor profitability at the farm level due to poor output market performance and linkages, particularly in the maize market where NFRA have left farmers stranded with produce and closed borders which have limited profit options.

- Poor access to inputs because of disruptive practices on the distribution channel. Failed interventions in subsidies and cost reduction programs have reduced the agrodealer distribution channel by an estimated 60%.

- Poor technical knowledge in the research, extension and distribution channels.

- A number of interventions in the SAGCOT area have the key productivity components of Credit, knowledge, supply of inputs (fertilizers, seed and CPP’s), linkages to output markets together successfully to ensure increased ROI at the farm level.
Finance:
Agricultural Economy Overview
Economic Overview: Major Points

- The agricultural economy is an important contributor to employment and GDP.
- The agricultural workforce is, on average, poorer than the national average.
  - This has significant implications relating to the ability to finance ag-sector activities.
The agricultural economy is a significant part of the overall economy.

- Currently, about two thirds of the workforce is employed in the agricultural sector.
- The ag sector generates a bit under one third of national GDP.
Economic Overview

The size of the ag workforce is larger than its proportional contribution to GDP. This means that a smaller amount of GDP accrues to a larger number of workers.
Economy Overview: Implications

Implications:

• On average, the ag workforce is “poorer” than average (below national parity).
• The ability of the ag workforce to build wealth (equity) is lower than average leading to:
  • Lower ability to self-finance their activities
  • Lower credit capacity
• This lack of financing has been confirmed in numerous surveys and studies.
• Lack of equity capital is severe and the most problematic financing issue to overcome.
• In the absence of new sources and/or structures to provide financing to the ag sector, it should be expected to grow at a sub-par rate.
Finance:
Commercial Banking Sector
Commercial Banking Sector: Major Points

• Commercial bank lending into the agricultural sector is extremely low given the size and importance of the ag economy.
• There are legitimate business reasons for this lack of lending.
• Financing the inventories of input dealers would be best achieved via trade finance.
• Financing the farmer, at the scale needed, is a problem that had yet to be solved.
Commercial Banking Sector

Tanzania Commercial Banking Sector: Asset Composition

- Ag Loans, 3.76%
- Other Assets, 96.24%

Comments and Observations:

- Loans to the agricultural sector are a very small part (<4%) of the banking sector’s asset mix.
- In relation to the ag sector’s importance in terms of employment and GDP contribution, ag lending lags far behind.
Commercial Banking Sector

Comments and Observations (continued):

- Bank lending to the ag sector is so small due to the nature of capital financing. Capital comes in two basic types, equity and debt.
  - Equity is the risk bearing capital. It participates in the gains/losses of the enterprise.
  - Debt’s return is fixed, it does not participate in the gains/losses of the enterprise. Thus it is not risk bearing. Debt is mean to be additive to, or leverage, equity capital. It is not a substitute for equity.

- Legitimate business reasons can explain why ag lending is so small. Two major factors are:
  1. Ag sector participants do not have adequate risk capital (equity) to support debt. Banks cannot be expected to provide debt financing when there is a lack of risk bearing (equity) capital.
  2. Even ignoring risk, small sized and short maturity loans are not profitable for banks. Many financing needs in the ag sector have these attributes.
The unfulfilled demand for financing becomes more acute as you go down the distribution chain.

Lack of creditworthiness and loan profitability make commercial bank lending less viable as you go down the distribution chain.

The economic attributes of financing fertilizer distribution down to the local agro-dealer level are very different from those of financing the end-user farmer.
Financing for Increased Fertilizer Usage

- Farmer financing, especially smallholder farmers, is the most difficult part.

- Some fertilizer demand goes unfulfilled due to lack of physical product where and when it’s needed (effective demand). This needs to be addressed with inventory financing that allows supplies to position inventories when and where they are demanded.

- Even if the inventory financing issues are eliminated, much demand will go unfulfilled due to lack of financing at the end-user farmer level (latent demand).

- Increased usage of fertilizers requires profitability and ability to purchase at the end-user farmer level.
Financing for Increased Fertilizer Usage: Possible Solutions

• Distribution Chain (Inventory) Financing
  • Trade credit offers the most promising route to provide inventory financing down the distribution chain. This is due to its attributes of:
    • Building business trust relationships between supplier and customer.
    • Control of physical flows allows for more efficient management and monitoring of credit risk.
    • Financing improves turnover and thus profitability, allowing financing costs to be balanced against product margins.

• Farmer Financing
  • This is the large problem that has yet to be solved. Several mechanisms have shown promise such as:
    • Outgrower programs
    • Aggregator programs
  • The scalability of the above programs is an issue due to the amount of management capacity and monitoring required to keep losses in check.
  • New sources of funding and new credit delivery mechanisms need to be created. Some type of equity (risk bearing) financing needs to part of the solution.
Finance:
Fertilizer Profitability
Fertilizer Profitability: Major Points

- Fertilizer profitability has a direct and important influence on demand.
- Demand is the key element that shapes the structure of the supply side.
- Realized demand depends on potential buyers to be both willing and able to purchase.
- Fertilizer profitability is impacted by large number of complex and ever changing factors. This makes it difficult to analyze.
- For the crops analyzed in Tanzania, our analysis shows that for rice profitability should support increased demand. However, the picture for maize is suspect at best. An additional factor in both cases is the farmer’s ability to purchase fertilizer products.
• The statistics showing that fertilizer usage in Africa has consistently lagged behind world averages have been well publicized for many years. This fact has driven many efforts across the continent with goal to reduce or eliminate this gap in an effort to increase farm yields.

• In the final analysis, end-user demand will be the driving force that shapes fertilizer distribution systems and the volume that they need to deliver.

• When approaching the demand environment, it is critical to understand the two major types of demand and how they impact current and potential usage of fertilizers:

• **Effective demand** – This is the volume of demand where the end-user farmer is both willing and able to purchase the products. Effective demand is determined by many factors such as cost/benefit, available supply and ability to purchase. While there exist gaps in certain markets where supply does not meet effective demand, these gaps are usually filled by profit seeking sellers and do not exist for long periods of time. Inefficiencies imposed on the supply chain could however artificially maintain the gaps.
Latent Demand – This is the volume of demand where the end-user farmer would be a willing buyer, but lacks a necessary element in order to become an able and willing purchaser. Common factors that determine latent demand can be product knowledge, unknown cost/benefit and lack of funds.

Consensus is that latent demand far outstrips gaps in meeting effective demand. There have been numerous programs focused on turning latent demand into effective demand, a few examples are:

- Farmer training and demonstrations
- Subsidy programs
- Input loan programs

Not withstanding these efforts, the “fertilizer usage gap” still remains.

Understanding the factors behind latent demand is needed in order to:

- Identify effective ways to address those factors, and
- Forecast the volume of potential demand in the market. This is critical for private sector investors who are making investment decisions.
Fertilizer Profitability

• We look to analyze fertilizer profitability because it has an important, but not exclusive, role in the determination of product demand.
• Although total profitability of farming is a function of many factors, it is safe to say that the economic return to the farmer from fertilizer usage defines some important limits. If economic returns are low to negative, issues of supply, education and others become moot. Conversely, high economic returns imply high potential demand. Either case will have significant impacts on investment decisions along the distribution chain.
• Returning back to the well known statistics on fertilizer usage in Africa, before one states that Africa should eliminate the usage “gap”, one needs to first demonstrate that doing so will not cause economic harm to the farmer.
Fertilizer Profitability Analysis

• There is no single figure that represents the profitability of fertilizer usage. Profitability is a “local not global” concept that is influenced by:
  • Specific geography
  • Crop
  • Method of usage/application
  • Other agronomic factors such as seed and CPPs
  • Ever changing market prices (input and crop)
  • Weather
  • Soil conditions
  • Timing of input purchase and sale of crops
    ... and these are just to name a few!
• Compounding the above issues are difficulty in getting accurate and consistent data with respect to costs, price and yield responses.

• Thus, we must preface this analysis with the caveat that our results are not definitive but indicative.
• We have limited the analysis to two staple crops, maize and rice.
• Specific sites were chosen that were central market locations.
• The most recent growing season was chosen where reliable data was available.
• We used fertilizer prices in effect at the planting season and crop prices at harvest season. While this may represent a “worse case” (for example crop prices can be at seasonal lows during harvest) we felt that it best represented the reality of the smallholder farmer.
• We used suggested fertilizer application rates and only considered “basic” products (DAP, Urea, NPK) and not any blended products.
• The analysis assumes that fertilizer application is the only variable. In practice, combining improved fertilizer usage with improved seed and other inputs and practices can maximize overall yield gains.
• Valid yield response data allows for direct computation of profitability given knowledge of fertilizer prices, application rates and crop prices. However, getting such yield response data is the greatest challenge.
• Because of the difficulty in locating valid yield response data, we calculated a range of yield responses that would be needed to achieve a range of returns on investment (ROI).
• There is no scientific/objective level of a minimum acceptable ROI, but a practical rule of thumb is that a two time return (200% ROI) is needed.
In order to reach an acceptable profitability of 200% ROI a yield response of about 2 mt/ha is required. This is an aggressive figure in relation to observed field studies.

The conclusion is that the benefits of fertilizer usage are marginal at best in supporting increased demand.

The remaining issue would be the ability of farmers to finance the purchase.
In order to reach an acceptable profitability of 200% ROI a yield response of 0.4 mt/ha is required. Some field studies have shown that an expected yield response of >2 mt/ha is achievable.

The conclusion is that the benefits of fertilizer usage are at a level that should strongly support increased demand.

As with maize, the remaining issue would be the ability of farmers to finance the purchase.
Fertilizer Profitability: Summary

• The analyses indicate that profitability should be a positive factor for increasing fertilizer demand with respect to rice in Tanzania. The picture with respect to maize is much less positive.

• Use of debt to finance fertilizer purchases introduces another cost that must be overcome. Obviously, the higher the cost of such financing, the lower the profitability thus reducing potential demand.

• Geographic location and infrastructure can have substantial impacts on profitability. Farms that are distant from centers of end-user demand and are served with poor transport infrastructure get “squeezed” from two directions. The cost of transportation lowers farm gate crop prices and increases input costs.

• Profitability is a necessary, but not sufficient element for supporting increased demand. Funds availability and product knowledge are examples of additional factors that shape final realized demand.
Tanzania Highlights

- Current Bulk Procurement Policy affects supply chain efficiency and private sector profitability
- Large investment infrastructure
- Gas and phosphate deposits exist but building projects has been difficult
- No blender in the country
- Acidic soils will affect nutrient use efficiency and farmer profitability
- 80% of fertilizers delivered to farmers is through the hub and spoke agro-dealer model
- Trade corridor to supply 4 countries
- Analysis of rice profitability indicates that there is scope for more fertilizer demand. Maize was more suspect.
- Trade and farmer financing structures will be essential to growing demand. Some of the financing instruments might have to be risk bearing.