Vale Fertilizantes
Business overview – Roger Downey
October 2015
Table of Contents

1. VF structure
2. Market update
3. Business model
1. VF corporate structure
Ownership structure

**Potash**
- Phosphates and Nitrogen
- Taquari-Vassouras
- Patrocinio
- Carnalita

**Phosphate**
- TIPLAM

**Logistics**

**Greenfield**
- Bayovar I&II (Peru)
- Kronau (Canada)

**Brownfield**

**Legal entity**

Source: Company data.

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(1) Vale has 51% of voting rights (control).
(2) Vale is currently discussing the potential sale of a minority stake in Kronau.
(3) The remaining 51% is held by VLI – a subsidiary controlled by Vale. VF’s share may be diluted as a result of an expansion project, but VF would retain its current commercial and political rights.
2. Market update
We believe in a strong fertilizer market

### Supply side
- Publicly available estimates overestimate production capacity for fertilizers
- Historical data shows that the market has never reached “full capacity”, even in boom years
- Depletion/decrease in grades of current mines is not fully factored into market estimates
- Several projects in the supply pipeline are actually unlikely to be implemented, or should suffer delays

### Demand side
- Population growth, mostly in Asia and Africa, should boost food supply needs
- Rising developing countries income, especially in BRIC’s and other Asian, is expected to shift food consumption habits
- Tight availability of arable land and water resources should boost fertilizer usage to cope with food demand
- Available estimates for future grain production growth are very conservative

There are healthy fundamentals for the global fertilizer sector
By 2030, grain production must increase significantly to meet global food demand

1. World grain production growth assuming FAO’s estimates - implicitly assumes deterioration of food habits
2. World grain production growth assuming maintenance of current per capita consumption
3. World grain production assuming increase in meat consumption per capita

<table>
<thead>
<tr>
<th>Year</th>
<th>1980</th>
<th>2010</th>
<th>CAGR 1.6%</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.5</td>
<td>2.5</td>
<td>0.9</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
</tr>
</tbody>
</table>

Annual per capita consumption (tons per capita)

- 1980: 0.34
- 2010: 0.36
- 2030: 0.32, 0.36, 0.38

Global grain production (bn tons)

- 1980: 0.7
- 2010: 2.5
- 2030: 2.5

Source: FAO, Company data.
We don’t believe that there will be excess capacity in either the phosphate...

**Global phosphate rock capacity evolution**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Ops + ramp-up</td>
<td>251</td>
<td>(35)</td>
<td>216</td>
<td>(27)</td>
<td>15</td>
</tr>
<tr>
<td>Utilization rate adjustment¹</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilization rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exhaustion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brownfield expansion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greenfield expansion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low probability projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational capacity 2030</td>
<td>270</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand 2030</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 – Nominal capacity adjustment to operational capacity considers 2007 demand peak deflator utilization rate.
2 – Additional potential demand assuming growth in meat consumption per capita (= 2x grain growth – FAO base).

**Global phosphate rock utilization rate**

- **CAGR Demand ‘14 – ’30 = 2.2%**
  - Adjusted Utilization Rate
  - Utilization Rate

  - 2005 - 2009: 94% (Adjusted), 81%
  - 2010 - 2014: 91% (Adjusted), 78%
  - 2015 - 2019: 90% (Adjusted), 77%
  - 2020 - 2024: 99% (Adjusted), 85%
  - 2025 - 2029: 111% (Adjusted), 96%

Source: Company data, CRU, IFA, Fertecon.
Global potash capacity evolution

(Mtons KCl)

Current Ops + ramp-up | Utilization rate adjustment¹ | Current capacity | Exhaustion | Brownfield expansion | Greenfield expansion | Low probability projects | Operational capacity 2030 | Demand 2030
---|---|---|---|---|---|---|---|---
80 | (10) | 70 | (6) | 7 | 19 | (5) | 85 | 112

1 – Nominal capacity adjustment to operational capacity considers 2004 demand peak deflator utilization rate.
2 – Additional potential demand assuming growth in meat consumption per capita (= 2x grain growth – FAO base).

Global potash utilization rate

CAGR Demand ‘14 – ‘30 = 2.7%

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted Utilization Rate</td>
<td>Utilization Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>92%</td>
<td>92%</td>
<td>88%</td>
<td>89%</td>
<td>96%</td>
</tr>
<tr>
<td>81%</td>
<td>85%</td>
<td>77%</td>
<td>78%</td>
<td>85%</td>
</tr>
</tbody>
</table>

* Does not include 2009.
Source: Company data, CRU, IFA, Fertecon.
3. Business model
Brazil is the market to be in for fertilizers

- Brazil is the only country able to respond to the food challenge in a significant way
- Increasing grain production from high land availability and continuous growth in land productivity (fertilizers & technologies)
- Most of the global growth in fertilizer consumption in the coming years should come from Brazil
- Significant advantages for local producers vis-à-vis foreign players

VF is the leading platform to play the Brazilian fertilizer market

- VF is the largest domestic producer of fertilizers by a long way (7x larger than the second-largest player)
- Unique combination of integrated logistics and proximity to key consumer regions
- Vale brand name
- Cost-cutting initiatives and improved sales policies
- Outstanding pipeline of projects

Vale Fertilizantes is uniquely positioned to benefit from the strong tailwinds in the fertilizer sector in Brazil

Source: Company
Brazil has unique advantages when it comes to agriculture... resulting in its leadership position in this segment

<table>
<thead>
<tr>
<th>Crop</th>
<th>Production</th>
<th>Exports</th>
<th>% of global exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybeans</td>
<td>2</td>
<td>2</td>
<td>39%</td>
</tr>
<tr>
<td>Corn</td>
<td>3</td>
<td>2</td>
<td>19%</td>
</tr>
<tr>
<td>Coffee</td>
<td>1</td>
<td>1</td>
<td>29%</td>
</tr>
<tr>
<td>Orange juice</td>
<td>1</td>
<td>1</td>
<td>77%</td>
</tr>
<tr>
<td>Meat</td>
<td>2</td>
<td>1</td>
<td>22%</td>
</tr>
<tr>
<td>Sugar</td>
<td>1</td>
<td>1</td>
<td>45%</td>
</tr>
<tr>
<td>Poultry</td>
<td>2</td>
<td>1</td>
<td>34%</td>
</tr>
</tbody>
</table>

Brazil’s leading role in global agriculture production is assured by its unique competitive advantages

Source: Company data, United States Department of Agriculture.
… and is the only country positioned to meet to the growth in global demand for grains

Brazil is the only country able to respond to the food challenge in a significant way

Source: Company data, FAO, ANDA, USDA, CRU, Sinprifert, Agroconsult.
Brazil is expected to boast the highest growth rates in the global fertilizer sector

**Phosphate demand**[^1]

(mt P₂O₅)

<table>
<thead>
<tr>
<th></th>
<th>2013E</th>
<th>2018E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Others</td>
<td>47.0</td>
<td>51.3</td>
</tr>
<tr>
<td>FSU</td>
<td>15.2</td>
<td>16.2</td>
</tr>
<tr>
<td>India</td>
<td>1.5</td>
<td>1.7</td>
</tr>
<tr>
<td>Brazil</td>
<td>4.7</td>
<td>5.2</td>
</tr>
<tr>
<td>US</td>
<td>4.6</td>
<td>5.0</td>
</tr>
<tr>
<td>China</td>
<td>13.9</td>
<td>14.9</td>
</tr>
</tbody>
</table>

**KCI demand**[^2]

(mt KCl)

<table>
<thead>
<tr>
<th></th>
<th>2013E</th>
<th>2018E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Others</td>
<td>52.6</td>
<td>67.3</td>
</tr>
<tr>
<td>India</td>
<td>18.2</td>
<td>22.1</td>
</tr>
<tr>
<td>FSU</td>
<td>2.9</td>
<td>6.4</td>
</tr>
<tr>
<td>US</td>
<td>8.3</td>
<td>9.3</td>
</tr>
<tr>
<td>Brazil</td>
<td>8.4</td>
<td>11.3</td>
</tr>
<tr>
<td>China</td>
<td>11.1</td>
<td>13.8</td>
</tr>
</tbody>
</table>

**Intensity of fertilizer consumption in Brazil**

**Fertilizer consumption** (kg nutrients / ha)

- Brazil: 185 kg
- US: 200 kg
- China: 306 kg

**Potential increase in fertilizer consumption** (mt nutrients)

- Current consumption (Mt nutrients): X
- Growth factor (Multiplier): 12.6
- Potential demand (Mt nutrients): 38.7

**Nutrient intensity at USA levels** (1.09x)

**Arable land expansion potential** (2.83x)

VF is strategically positioned to capture the growth in Brazil’s fertilizer demand and increase its market share.

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**Source:** Fertecon, Company data, IFA, CRU, companies data.

[^1]: Total phosphate consumption includes MAP, DAP, TSP, SSP, rock for direct application and other phosphates.

[^2]: KCI deliveries.
Brazil market structure provides significant cost advantages to the local fertilizer producer

**Logistics to Brazil**

<table>
<thead>
<tr>
<th><strong>Illustrative export logistics cost to Brazil</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Seaborne shipping costs" /></td>
<td><strong>US$25–30/t</strong>(1)</td>
</tr>
<tr>
<td><img src="image" alt="Port charges" /></td>
<td><strong>US$15–20/t</strong>(2)</td>
</tr>
<tr>
<td><img src="image" alt="Truck to inland blenders" /></td>
<td><strong>US$40–50/t</strong>(4)</td>
</tr>
<tr>
<td><img src="image" alt="Total delivered cost" /></td>
<td><strong>US$101–121/t</strong></td>
</tr>
</tbody>
</table>

**Source:** Company data, CRU, industry research reports.

(1) Vancouver / Baltic Sea.
(2) Paranaguá Port.
(3) AFRMM is Additional Freight for Renewal of the Merchant Navy: a tax imposed on inbound Brazilian freight (CRU).
(4) Paranaguá to Mato Grosso.
Brazilian market – Testing our business model

**Delivery**

  - NPK: 8.607 (2014) → 7.858 (2015), -8.7%
    - N: 2.349 (2014) → 2.129 (2015), -9.4%
    - P2O5: 2.971 (2014) → 2.669 (2015), -10.2%
    - K2O: 3.287 (2014) → 3.060 (2015), -6.9%

**Production**

- Products: 5.691 (2014) → 5.952 (2015), 4.6%
  - NPK: 1.902 (2014) → 2.037 (2015), 7.1%
    - P2O5: 1.293 (2014) → 1.337 (2015), 3.4%
    - K2O: 171 (2014) → 177 (2015), 3.4%

**Import**

- Products: 15.917 (2014) → 14.264 (2015), -10.4%
    - N: 2.117 (2014) → 1.844 (2015), -12.9%
    - P2O5: 2.173 (2014) → 2.016 (2015), -7.2%
    - K2O: 3.870 (2014) → 3.345 (2015), -13.6%

**Notes**

- 2014 (Jan-Aug)
- 2015 (Jan-Aug)
Vale Fertilizantes is the leading fertilizer producer in the country by a long way.

**Phosphate capacity in Brazil (P₂O₅)**

- **Vale:** 1,950 kt
- **Anglo American:** 284 kt
- **Galvani:** 219 kt
- **Other:** 224 kt

**Fertilizers market share in Brazil** (total supply, 2014)

- **Phosphate (P₂O₅):**
  - Imports: 62%
  - Local production: 38%
  - 81% Vale
  - Other local producers: 7%

- **Potash:**
  - Imports: 95%
  - Local production: 5%
  - 31% Vale
  - Other local producers: 7%

**VF highlights**

- **Largest fertilizer producer in Brazil:**
  - ~7x larger than the 2nd local producer in phosphates
  - Only potash producer in the country
  - ~50% market share in the Southeast & Central-West regions

- **Vertically integrated:**
  - Operations throughout the production chain, from potash and phosphate rock mining to end-product manufacturing

- **Own port:**
  - Dedicated private port terminal
  - Strategically positioned
  - Capacity of 2.8Mtpy

**VF is uniquely positioned to benefit from the positive fertilizer sector dynamics in Brazil**

Source: Fertecon, Company data, IFA, CRU, companies data.
Assets strategically located next to the region with the greatest potential for fertilizer consumption

Advantages of VF’s geographic footprint

- **Exposure to the Cerrado region**
  - … region with the highest growth prospects in the country in the coming years

- **Strong price competitiveness**
  - Logistics advantages versus imports

- **Just-in-time deliveries**
  - … to a significant portion of its customers

- **Long-term relationship with customers**
  - Close relationships with customers in the main agricultural regions of Brazil

- **Integrated logistics**
  - Own and third party infrastructure, which further strengthens VF’s fertilizer distribution

Source: Company data, BPI, CONAB, MAPA EMBRAPA, IBGE.
Unique integrated logistics infrastructure and distribution capabilities…

VF’s logistics corridors

VLI / VALE’s Railroads

- EFVM – Ferro Vitória to Minas highway
- EFC – Ferro Carajás highway
- FNS – Norte Sul railroad
- FCA – Centro-Atlântica railroad

- Opportunities
- ALL
- Vale’s ports
- Third-party ports
- Cerrado
- Region with the highest growth prospects in the coming years

- Vale’s logistics portfolio in Brazil also includes 11,271km of railroads (directly and indirectly)

VF benefits from Vale's significant logistics infrastructure to distribute fertilizers in Brazil

Source: Company data.
(1) TIPLAM is 49% owned by VF and 51% by VLI, a company controlled by Vale.
…with a dedicated port terminal in Santos that brings an unparalleled competitive advantage to foreign supply

Key advantages

- Private, mixed-use port terminal located outside the public port of Santos concession area
- Strategically positioned with available area for further expansion
- One of the two ports in Brazil that can handle ammonia, but the only one with scale
- Road and rail access (ALL, MRS and FCA) with high productivity
- 75% of total sulfur imports in Brazil
- Adapted to handle phosphate rock
- Located near to 4 units of Vale Fertilizantes that could be used as backyard

Expansion project

- Expansion project underway with expected Capex of R$2.2 bn
- Potential to double capacity by adding an additional fertilizer berth of 2.8 Mtpa
- Terminal also provides additional capacity for general cargo
- Three new warehouses for grains and one for sugar, and a flexible storage unit that can hold both sugar and grains

Source: Company data.
We are doing our homework

**Improvements in sales policies (actual gains in 2014)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Gain (US$ mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price increases for gypsum</td>
<td>+27</td>
</tr>
<tr>
<td>Premium increases for ammonium nitrate</td>
<td>+11</td>
</tr>
<tr>
<td>Revised methodology for allocation of shipping costs in the fertilizer segment</td>
<td>+17</td>
</tr>
<tr>
<td>Increased premiums for nitric acid/ammonia</td>
<td>+5</td>
</tr>
<tr>
<td>Strategy for capturing a premium in the animal nutrition segment</td>
<td>+12</td>
</tr>
</tbody>
</table>

**Cost-cutting initiatives (actual savings in 2014)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Savings (US$ mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical and technical factors</td>
<td>10</td>
</tr>
<tr>
<td>Lower freight costs</td>
<td>11</td>
</tr>
<tr>
<td>Services</td>
<td>21</td>
</tr>
<tr>
<td>Lower cost of rock</td>
<td>9</td>
</tr>
<tr>
<td>Labor optimization</td>
<td>10</td>
</tr>
<tr>
<td>General expenses and others</td>
<td>15</td>
</tr>
</tbody>
</table>

**Total**

- **Improvements in sales policies**: US$ 72 mm
- **Cost-cutting initiatives**: US$ 76 mm

Source: Company data.
World-class expandable resource base, underpinned by a broad pipeline of projects

**K Kronau**
- Capacity: 4.0 Mtpa of potash
- Reserves: 621mt @ 29.1% KCl

**P Bayovar II**
- Capacity: 1.9 Mtpa of p-rock
- Reserves: 409mt(2) @ 15.4% P₂O₅

**K Carnalita**
- Capacity: 1.4 Mtpa of potash
- Reserves: 302mt @ 12.2% KCl

**P Patrocínio**
- Capacity: 1.3 Mtpa of phosphate rock
- Reserves: 486mt @ 12.1% P₂O₅

Source: Company data.
<table>
<thead>
<tr>
<th>Key takeaways</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Brazil is an agriculture powerhouse and the <strong>world's most attractive fertilizer market</strong></td>
</tr>
<tr>
<td>✓ There are <strong>significant advantages for local producers</strong> vis-à-vis foreign players</td>
</tr>
<tr>
<td>✓ Vale created a <strong>leading platform</strong> to tap the Brazil market, with a unique combination of assets <strong>strategically located</strong> close to main agricultural frontiers in Brazil and an unparalleled <strong>integrated logistics infrastructure</strong></td>
</tr>
<tr>
<td>✓ Constant <strong>improvements in sales policies and cost-cutting measures</strong> will assure the company’s increased profitability</td>
</tr>
<tr>
<td>✓ A strong <strong>pipeline of world-class projects</strong> to serve the fast growing Brazilian market will assure the company’s growth going forward</td>
</tr>
</tbody>
</table>