World Phosphate Availability and Supply-Demand in India

FAI Management Development Program
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World Phosphate Availability
World Phosphate Availability

- **Overview**
  - Phosphate rock – production & reserves
  - Phosphate fertilizers – production & trade
  - Future prospects
Critical role of plant nutrients

- Plant nutrients are responsible for 40% to 60% of crop yields
- Vital role in meeting the challenge of feeding more than nine billion people in 2050

“Farmers can feed the world. Better seeds and fertilizer, not romantic myths, will let them do it.”

Dr. Norman Borlaug
Wall Street Journal
July 30, 2009

“This is a basic problem – to feed 6.6 billion people. Without chemical fertilizer, forget it. The game is over.”

Dr. Norman Borlaug
New York Times
April 30, 2008
Overview of Phosphates

- The production process - making phosphorus water soluble
- Key inputs: phosphate rock mineral ore, sulphur and ammonia
- Global agricultural use: ~41 million MT $P_2O_5$ in 2012 or more than 120 million MT of product
- Leading producers: USA, China, Morocco/North Africa, Russia
Overview

- Phosphate rock – production & reserves
  - Phosphate fertilizers – production & trade
  - Future prospects
Phosphate Rock Production

- Average 2008 - 2012
  - <3.0 million tonnes
  - 3.0 - 15.0 million tonnes
  - 15.0 - 30.0 million tonnes
  - >30.0 million tonnes

Source: Fertecon and Mosaic
Million Tonnes of Phosphate Rock
Phosphate rock reserves and resources

Reserve Estimates
- Up to 350 years of production at current rates

Resource Estimates
- More than 1,525 years of production at current rates

Source: USGS and IFDC
World Phosphate Availability

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Global phosphate production (DAP/MAP/TSP)

- **China**
  - Accounted for **ALL** of the net growth in phosphate supply since 1995
  - Transition from low-analysis to high-analysis phosphate products

- **Future supply growth largely from new low cost capacity**
  - Morocco
  - Saudi Arabia

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**Top Producing Countries**

- **China**
- USA
- India
- Morocco
- Russia
- Brazil
- Saudi Arabia
- Tunisia
- Mexico
- Australia

**Source:** CRU/FRC and Mosaic, 2012
Phosphate product trade

Global Phosphate Product Imports
(DAP/ MAP/ TSP)

Source: CRU/FRC and Mosaic

Top Importing Nations

<table>
<thead>
<tr>
<th>Nation</th>
<th>Mil Tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>5.0</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.5</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1.0</td>
</tr>
<tr>
<td>Argentina</td>
<td>0.5</td>
</tr>
<tr>
<td>Australia</td>
<td>0.25</td>
</tr>
<tr>
<td>USA</td>
<td>0.25</td>
</tr>
<tr>
<td>Pakistan</td>
<td>0.25</td>
</tr>
<tr>
<td>Vietnam</td>
<td>0.5</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.25</td>
</tr>
<tr>
<td>Canada</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Top Exporting Nations

<table>
<thead>
<tr>
<th>Nation</th>
<th>Mil Tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>6.0</td>
</tr>
<tr>
<td>China</td>
<td>5.0</td>
</tr>
<tr>
<td>Morocco</td>
<td>4.0</td>
</tr>
<tr>
<td>Russia</td>
<td>2.0</td>
</tr>
<tr>
<td>Tunisia</td>
<td>1.5</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>1.0</td>
</tr>
<tr>
<td>Lithuania</td>
<td>0.5</td>
</tr>
<tr>
<td>Mexico</td>
<td>0.5</td>
</tr>
<tr>
<td>Jordan</td>
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<tr>
<td>Australia</td>
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Source: CRU/FRC and Mosaic, 2012
World Phosphate Availability

- Overview
- Phosphate rock – production & reserves
- Phosphate fertilizers – production & trade
- **Future prospects**
Farmers will need to harvest record area and reap ever increasing yields in order for global grain and oilseed supply to keep pace with projected demand.

The food story remains compelling

**Long Term Grain and Oilseed Demand**
- Steady and predictable demand growth
- Population and per capital income are key drivers

**The Food Story by the Numbers**
- Farmers will need to harvest record area and reap ever increasing yields in order for global grain and oilseed supply to keep pace with projected demand.
Global phosphate demand outlook

- Increase to 64-66 million MT DAP/MAP/TSP
- 3.5% CAGR since 2000
- Record prospects in Brazil
- Rebound in demand from India
- Positive prospects in nearly all other regions
Positive and more stable supply outlook

- Additional capacities in Saudi Arabia, Jordan & Morocco
- At existing operating rate, growing capacity will be able to keep pace with growth in demand

Source: CRU/ FRC and Mosaic

Global Phosphate Capacity, Production and Operating Rate
Likely Scenario

- Capacity
- Production
- Acid Operating Rate
Saudi Arabia

- Ma’aden looks to benefit from improved Indian demand prospects for 2014/15 and will remain one of the two dominant suppliers.
- Remains to be seen when Ma’aden Phase 1 ramps up to capacity.
- Expansion at Ras Al-Khair scheduled for 2016.

![Bar chart showing Saudi Arabia Phosphate Exports from 2000 to 2014 F, with specific data points for export and production capacity. The chart is sourced from CRU February 2014.](chart.png)
Supply-Demand in India
Supply-Demand in India

- Overview
  - Phosphate demand trend
  - Recent changes in Phosphate demand
  - Phosphate supply
  - Future prospects
- Phosphate use over 7.5 million MT
- Grain & oilseeds account for >75% of P$_2$O$_5$ consumption
- 5% of India’s Phosphate use is from domestic sources
- India imports phosphates from various origins and in different forms
- DAP supplies over 60% of India’s phosphate requirement
Average all-India P$_2$O$_5$ use is ~38 kg/ha vs. ~100 kg/ha in China

P$_2$O$_5$ usage is down to an estimated 28 kg/ha in 2013-14

Under application of P in almost all crops – tremendous upside exists

* Does not include P2O5 from SSP
Supply-Demand in India

- Overview
- **Phosphate demand trend**
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  - Future prospects
India’s P use grew at an impressive 6.5% CAGR over the past 3 decades.
Supply-Demand in India

- Overview
- Phosphate demand trend
- **Recent changes in Phosphate demand**
- Phosphate supply
- Future prospects
Recent changes in P demand

- Sharp decline in phosphate use after 2010-11, driven by hike in prices
  - Decline in 2013-14 estimated ~18% from 2012-13
- DAP use in 2013-14 declined by 25% from 2012-13

SOURCE: FAI & MOSAIC
MRP changes in DAP – drivers

In 000 INR/MT

12.0

MRP Apr’11

22.5

MRP Apr’14

SOURCE: MOSAIC ANALYSIS
MRP changes in DAP – drivers

In 000 INR/MT

MRP Apr’11

India CFR impact

$612 \rightarrow $480

↓ 8.2

US$/MT

India CFR

MRP Apr’14

SOURCE: MOSAIC ANALYSIS
MRP changes in DAP – drivers

In 000 INR/MT

MRP
Apr’11

12.0

India CFR impact

$612 → $480

19.8

14.4

12.4

Apr-11

Apr-12

Apr-13

Apr-14

Subsidy impact

INR 19,763 → 12,350

↑ 7.4

NBS

Moscic

SOURCE: MOSAIC ANALYSIS

INR 44.4 → 62/ US$

$612 → $480

19.8

14.4

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Apr-11

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SOURCE: MOSAIC ANALYSIS
MRP changes in DAP – drivers

In 000 INR/MT

MRP changes in DAP – drivers

In 000 INR/MT

MRP Apr’11

12.0

MRP Apr’14

22.5

INR/US$

INR 44 $62/ US$

68.4

62.3

↑ 11.3

Source: MOSAIC ANALYSIS
MRP changes in DAP – drivers

In 000 INR/MT

- MRP Apr’11: 12.0
- India CFR impact: ↓ 8.2
- Subsidy impact: ↑ 7.4
- Exch rate impact: ↑ 11.3
- MRP Apr’14: 22.5

INR 19,763 → 12,350
$612 → $480
INR 44 → 62/ US$

- Additional burden from weaker INR
- Subsidy saving achieved
Farmer price has a great impact on P Use

- Balance in prices helps the N:P use ratio to improve

SOURCE: FAI & MOSAIC
Supply-Demand in India

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- **Phosphate supply**
- Future prospects
India is the 3rd largest Phosphate producer in the world

- 19 DAP/ NP-NPK plants in India

- Along the coast

- $P_2O_5$ capacity of 4.9 million MT, operating rate ~72%

- Supplies ~50% of India’s P requirement
Phosphate Imports

- P imports to India are in various forms & origins
  - Phos acid (24%), Phos rock (27%), Finished product (48%)
- DAP imported from various origins

![Chart showing DAP imports by origin from 2007-08 to 2013-14e, with data from FERTECON & MOSAIC.](chart.png)
Supply-Demand in India

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- Phosphate supply
- **Future prospects**
India poised for a rebound in 2014-15

- Lower channel opening inventory vs. past 2 years
- Stable farmer price
  - DAP subsidy unchanged at INR12,350/MT for 2014/15
- Good farmer sentiments
  - Attractive economics
  - Good monsoon
  - Reservoir levels ↑
- DAP sales estimated to grow back to 2012-13 levels
- Import demand projected to grow by 56%
Long term demand drivers intact

Increased food demand
- Population growth @ 1.6%
- Better diets

Attractive farmer economics & need for better yields
- Balanced N, P, K prices
- P & K application rate
- Balanced N:P & N:K use ratio
Phosphate demand forecast

- Phosphate demand derailed from its trajectory
- When will use be back to normal?

SOURCE: FMS & REPORT OF THE WORKING GROUP ON FERTILIZER INDUSTRY FOR 12TH FIVE YEAR PLAN, FAI
THANK YOU!

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