Fertilizer Management: Global Issues and Challenges

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3 Meeting food demand / Reducing environmental footprints
IFA Mission “Message House”

VISION
The efficient and responsible production, distribution and use of plant nutrients play a vital role in achieving global food security (and sustainable development).

MISSION
As the only international association for the global fertilizer industry, IFA promotes the industry through its research and outreach initiatives.

STATISTICS & MARKET INTELLIGENCE
Authoritative, comprehensive information about the industry and fertilizer markets is the basis of robust competition on the open market, trade and appropriate policies.

The information provided through IFA’s statistics and analyses are critical for the industry and policymakers alike.

BUSINESS NETWORKING
Peer-to-peer contacts remain fundamentally important for the industry’s business operations and robust competition. Networking also facilitates the exchange of best practices to drive improved performance.

IFA provides open forums for networking and the exchange of knowledge and expertise.

INTERNATIONAL ENGAGEMENT
International institutions and initiatives address issues that can directly or indirectly pertain to fertilizer production, distribution and use.

IFA engages with relevant agricultural, scientific and policy forums and stakeholders to gain insight into diverse viewpoints and to share the industry’s perspectives.

BENCHMARKING & BEST PRACTICES
Continuous improvement is critical for the sustainable production, distribution and use of fertilizers.

IFA is uniquely placed to promote best practices throughout the fertilizer value chain and to foster improvement in the industry’s own performance through benchmarking.

APPROACH
IFA provides a framework for collaboration within the fertilizer value chain on areas of common interest, platforms to discuss the complex issues facing the sector today and a structure for agreeing common positions and joint actions.

Presenting the International Fertilizer Industry Association

This motion graphic video provides a broad overview of the International Fertilizer Industry Association’s scope of work. It highlights its membership, key activities, committee structure and encourages existing and potential new members to join and be pro-active in the work of the association.
Steady increase in world fertilizer demand
5-year outlook

<table>
<thead>
<tr>
<th>Region</th>
<th>Av. 2010/11 to 2012/13</th>
<th>Variation in 2017/18</th>
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<tbody>
<tr>
<td>East Asia</td>
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<td>South Asia</td>
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<td>North America</td>
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<tr>
<td>Lat. Am. &amp; Carib.</td>
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<tr>
<td>W. &amp; C. Europe</td>
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<td>E. Eur. &amp; C. Asia</td>
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<td>West Asia</td>
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<tr>
<td>Oceania</td>
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</tbody>
</table>

Source: IFA Agriculture

Overview of fertilizer demand

Steady increase in world fertilizer demand
5-year outlook
Steady increase in world fertilizer demand
Outlook to 2030

The impact of alternative economic growth assumptions

Fertilizer consumption (million tonnes)

- Fast, 6% per year
- Base, 4% per year
- Slow, 2% per year

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>124.3</td>
<td>154.5</td>
<td>185.7</td>
</tr>
<tr>
<td>Phosphate</td>
<td>6.3</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Potash</td>
<td>2.1</td>
<td>2.3</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Source: Integer

Indonesian fertilizer demand

- #5 market, following China, India, USA and Brazil
- 3.2% of world consumption

Fertilizer use by crop:
- Rice
- Maize
- Soybean
- Oil palm
- Oth oilseeds
- Sugar crops
- Roots/Tubers
- Fruits
- Vegetables
- Oth crops

Evolution of total demand

- Million tonnes nutrients

Forecast

2017
Meeting food demand / Reducing environmental footprints

Food security and meeting demand

- Feed 2 billion more people by 2050
- Still 850 million hungry
- Increasing demand for livestock products
- Competing demand for feedstock for biofuels / bioenergy

60% increase in total agricultural production (latest FAO projection)
Increase yields and cropping intensity: 90% of the anticipated gain
Greater (and more efficient) use of fertilizers (and other nutrient sources)
Industry responds through heavy investments in additional capacity
Preventing land use changes

- World arable land area in 2009: 1,533 Mha
- Anticipated expansion by 2050: 70 Mha (+4.6%)
  + 120 Mha in developing countries
  - 50 Mha in developed countries
- Conversion to arable land releases huge amounts of CO₂
  260 t CO₂-eq/ha for temperate forests
  590 t CO₂-eq/ha for tropical forests
- Increasing productivity is a must to:
  - Mitigate GHG emissions from land use changes
  - Preserve biodiversity-rich areas

Improving nutrient use efficiency

**NITROGEN**
- ~40% recovery under farm conditions in year of application (global average)
- 60-80% in research plots → room for improvement
- NUE improving for 3 decades in developed countries; since 2008 in China
- NUE stagnating or declining in most developing countries
- Improving in recent years in Indonesia (kg grain / kg N applied)

**PHOSPHATE**
- Losses mostly through erosion (slopping land, concentrated livestock farming)
- Low PUE in year of application, but can reach up to 90% using the balance method over at least a decade
Urgent need to restore soil fertility

- Average fertilizer application rate ~9 kg nutrients/ha / Mostly on cash crops
- Not sufficient to offset nutrients removed \( \rightarrow \) massive soil mining
- More than 40% of the 220 Mha of farmland lose > 30 kg nutrients/ha/year
- Losses worth US$ 4 billion annually \( \rightarrow \) Urgent need to replenish African soils’ nutrient pools
- Need innovative approaches to improve nutrient supply and use in the region

Fertilizing Crops to Improve Human Health

New paradigm
- Not only improve soil fertility, yield and profitability; but reduce environmental impact,
- … also enhance human health
- From food security (enough calories) to nutrition security (all essential nutrients)

Success stories
- Zinc in Turkey
- Selenium in Finland and New Zealand \( \rightarrow \) Need to scale up

Fertilizer can also influence composition of food products
- N, S \( \rightarrow \) proteins
- K \( \rightarrow \) lycopene, isoflavone
Nutrient stewardship programs

- Inappropriate fertilizer practices are widespread:
  - Blanket recommendations;
  - Unbalanced fertilization
  - Single basal application;
  - No soil testing/plant analysis
- Often responsible for large yield gaps and poor fertilizer use efficiency
- Best management practices improve productivity, profitability, preserve the environment → meet the economic, social and environmental goals

Nutrient Stewardship actively promoted by the fertilizer industry:

- Apply the right source, at the right rate, at the right time, in the right place

Knowledge transfer

- Developing countries account for 2/3 of world consumption
- Inefficient ‘conventional’ governmental extension
- Hundreds of million smallholder farmers are not satisfactorily advised on fertilizer management → poor use efficiency

- Develop solutions to supplement extension workers
  - Partner with farmers organizations to improve outreach
  - Train agri-input dealers to provide agronomic advice
  - Use mobile phone technology for customized, real-time, crop- and site-specific recommendations
Special products

- Slow- and controlled release fertilizers
- Stabilized fertilizers
- Fertilizers supplemented with micronutrients
- Soluble / liquid fertilizers (fertigation, foliar sprays)

- Mostly used on specialty crops
- Constrained by price differential
- New products could alleviate the price constraint
- Virtual Fertilizer Research Center (launched in 2010 by IFDC): Creating the next generation of fertilizers

Summary and conclusion

- IFA is delighted to co-host this meeting with our Indonesian partners
- Indonesia can play a key role in a global action and advocacy campaign on nutrient management
- IFA looks forward to the outcome of these discussions and are ready to join hands with all of you in improving the global image of our industry
For questions / comments
chebebrand @ fertilizer.org