



Knowledge grows

# Where Does Your Fertilizer Come From & What Determines Cost?

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Cotton & Corn Crop Manager

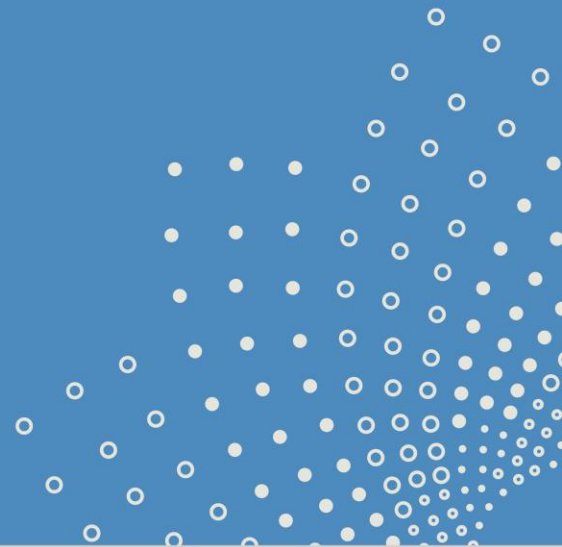
Yara North America



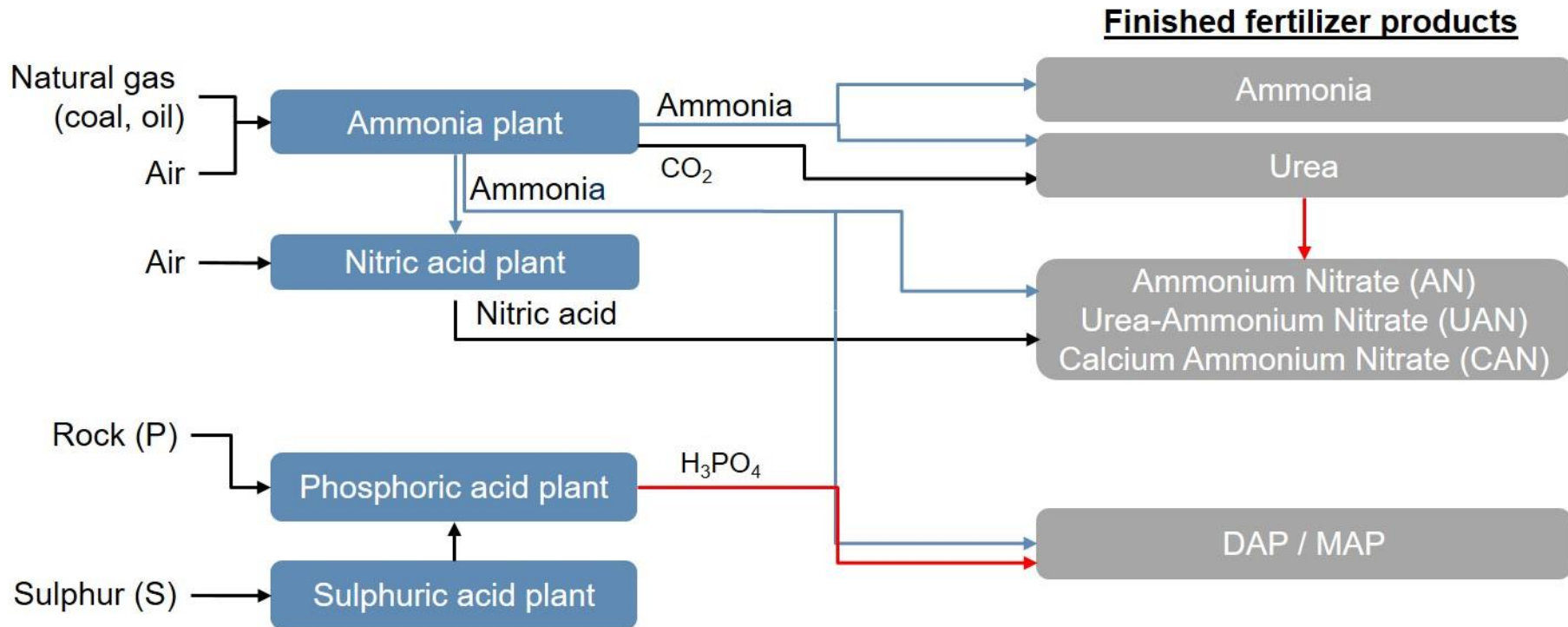
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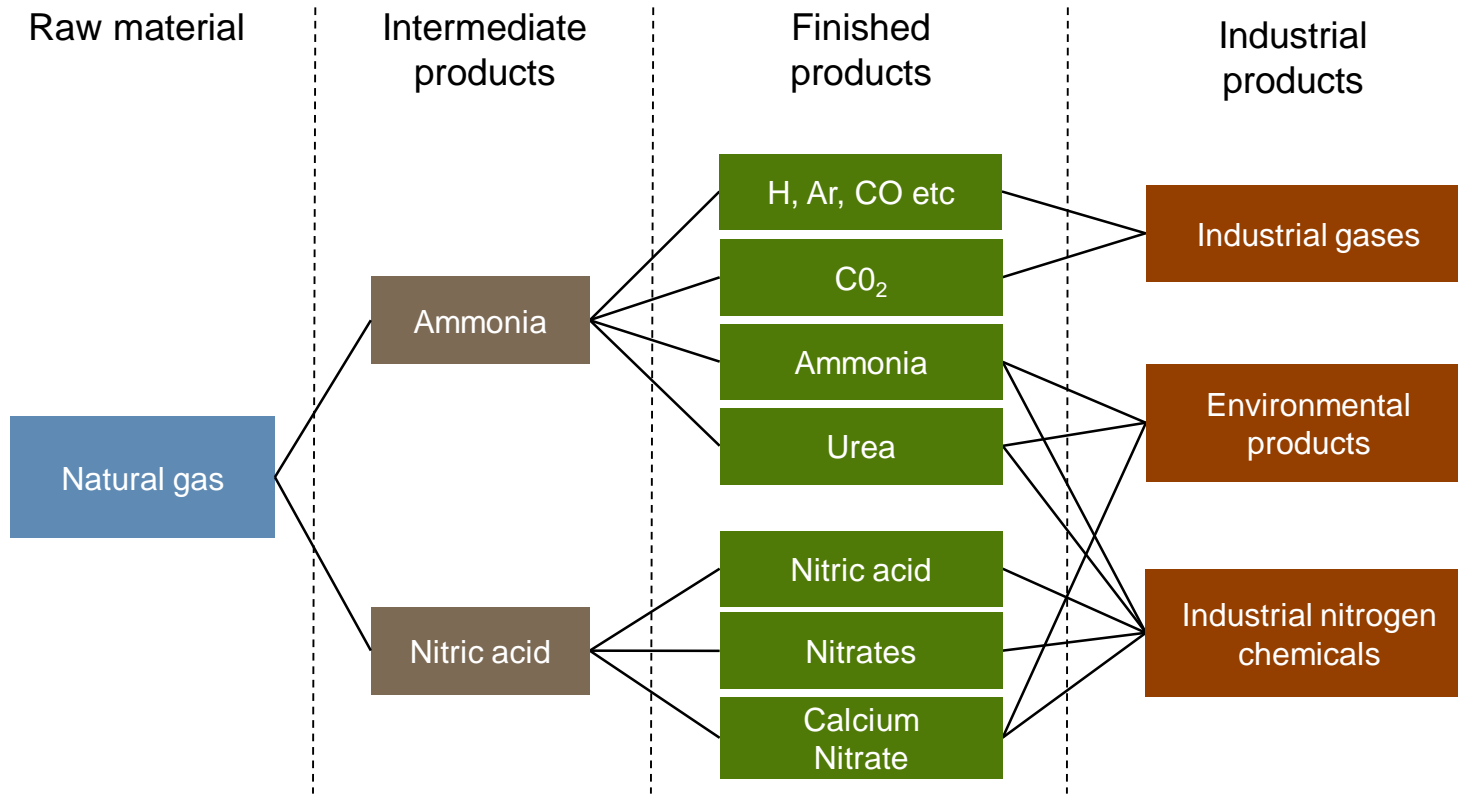
# Fertilizer Production



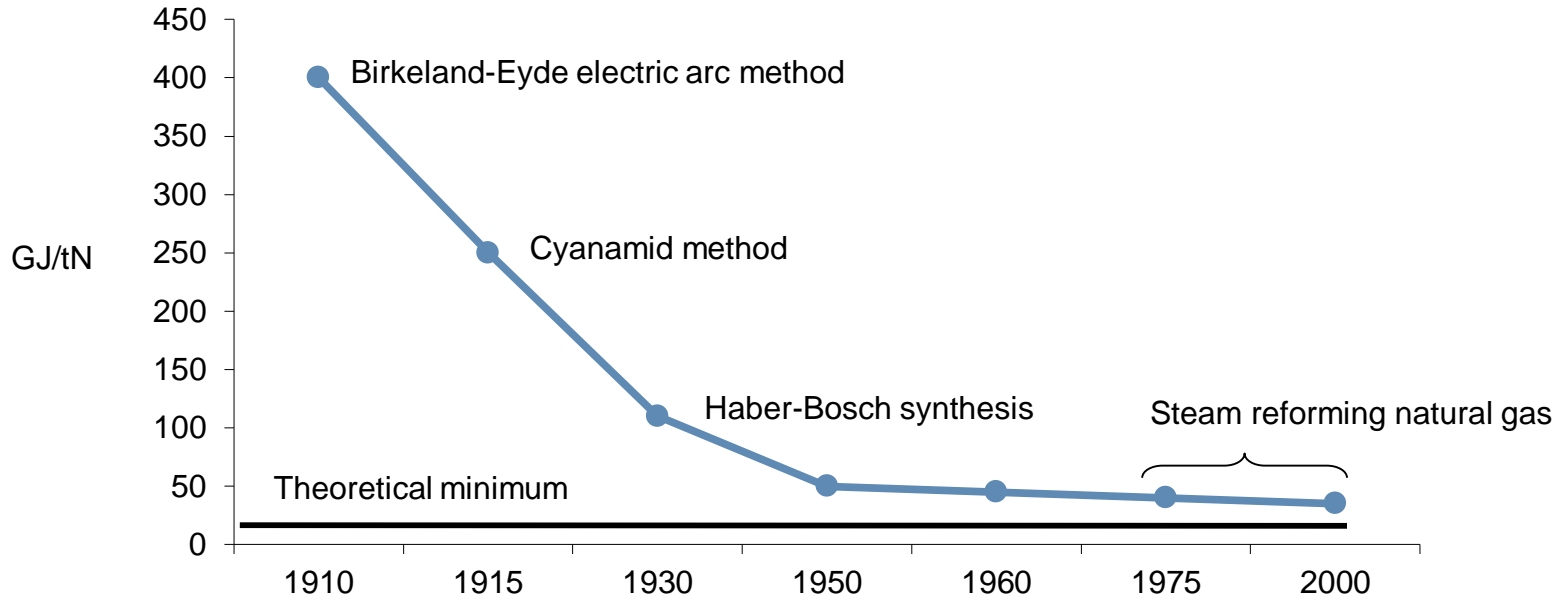
# Fertilizer production routes



# Nitrogen value chain

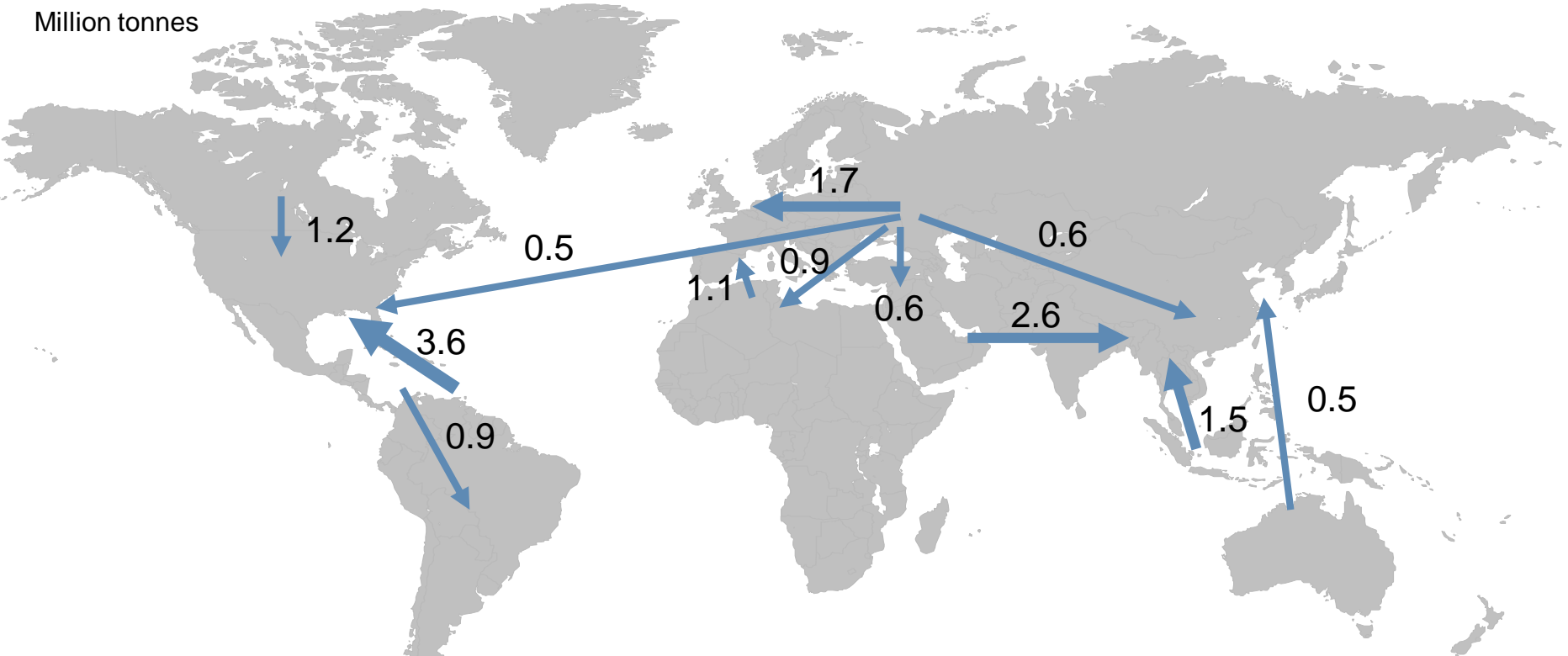


# Nitrogen Technology Evolution



# Main ammonia trade flows

Million tonnes

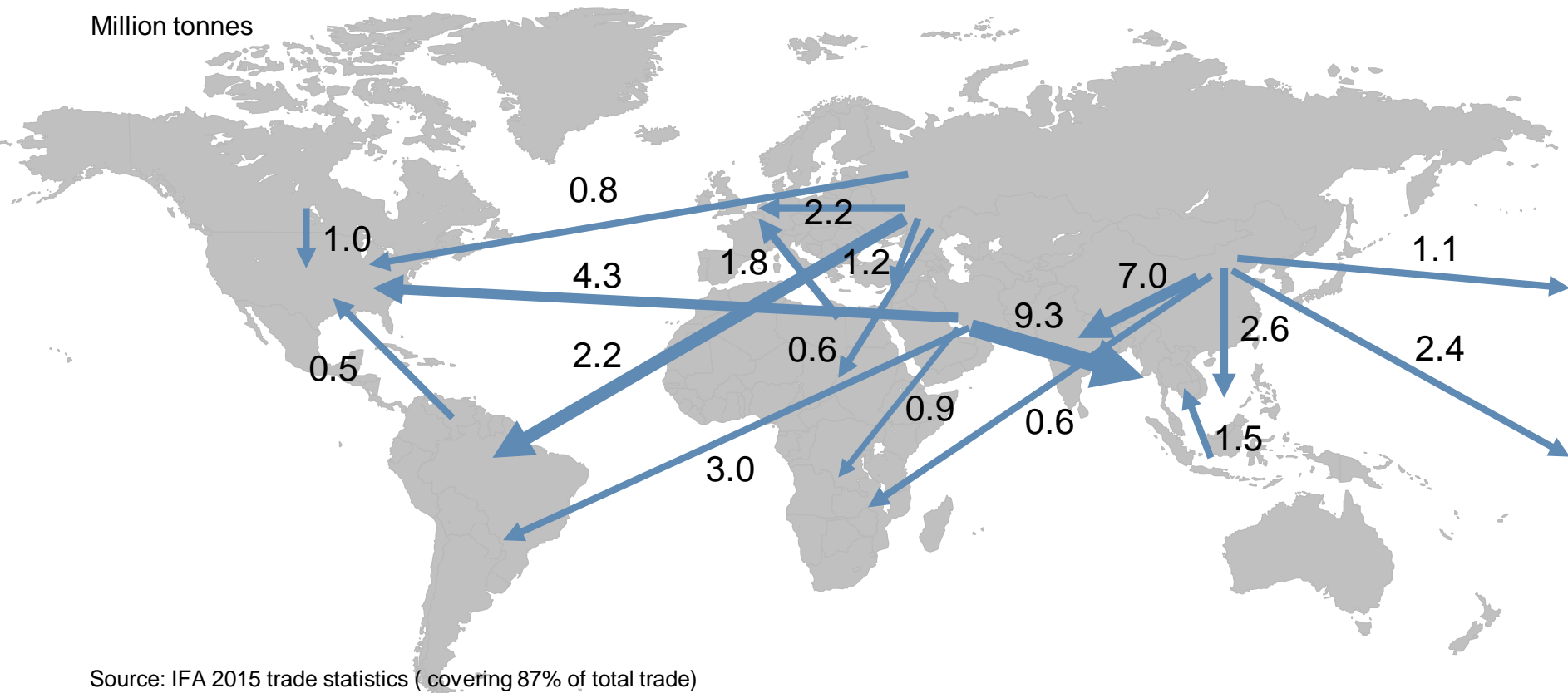


Source: IFA 2015 trade statistics ( covering 85% of total trade)



# Main urea trade flows

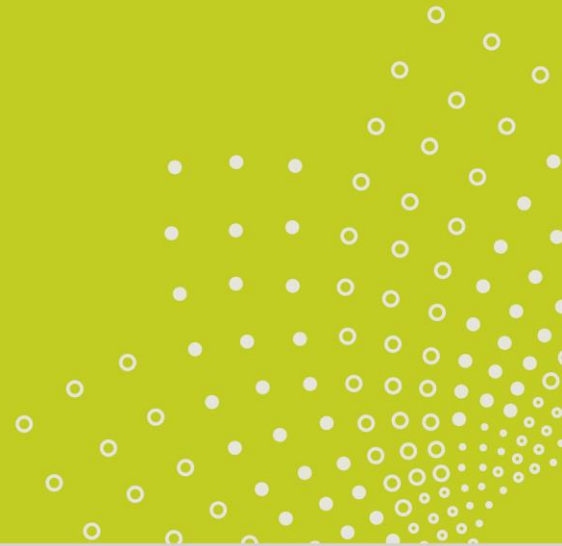
Million tonnes



Source: IFA 2015 trade statistics (covering 87% of total trade)



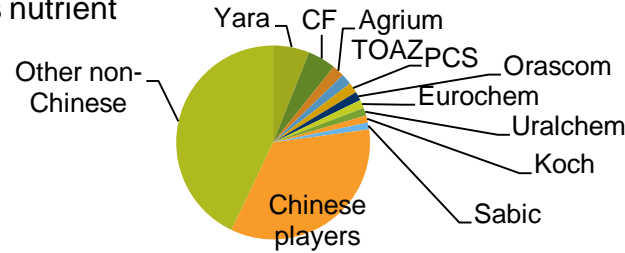
# The Fertilizer Industry



# The N industry is fragmented, while the P and K industries are more concentrated

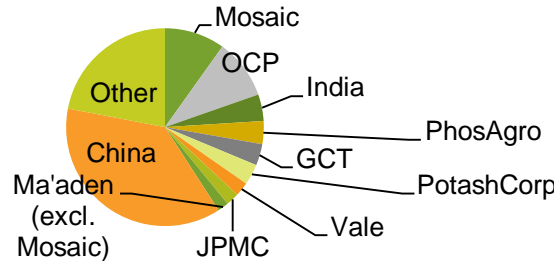
2015 figures<sup>1</sup>, million tonnes nutrient

Nitrogen<sup>1</sup>  
(N)



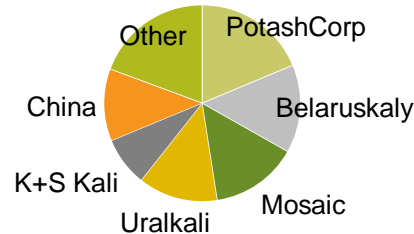
- Despite a consolidation trend, the industry is still higher fragmented
- Top 3 producers account for only ~15% of world capacity

Phosphate  
(P)



- More concentrated than N-industry
- Top 3 producers account for ~24% of capacity

Potash  
(K)

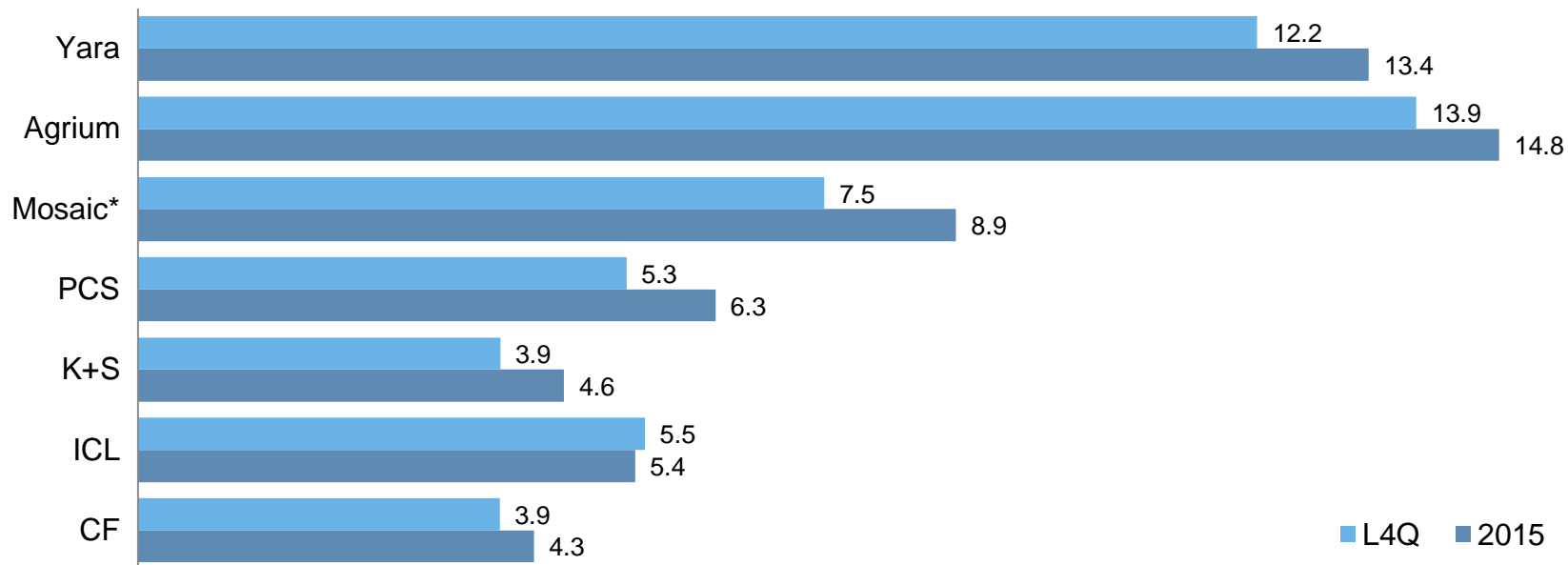


- Highly concentrated industry
- Top 3 producers account for ~48% of capacity

1) Nitrogen: 2013 figures  
Source: IFA

# Fertilizer Company Comparison

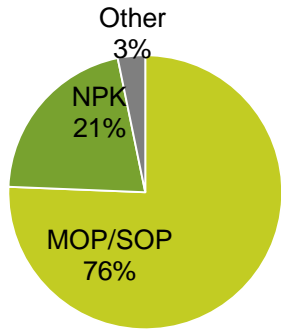
Revenues - USD billion



Source: Thomson Worldscope

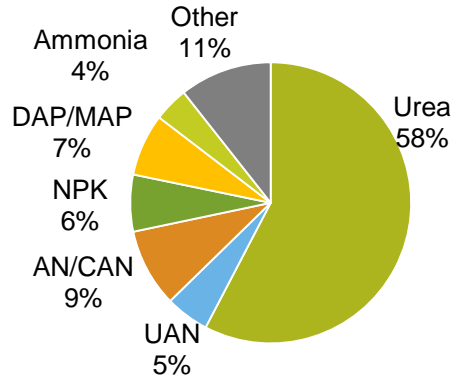
# Key global fertilizer products

Potash  $K_2O$



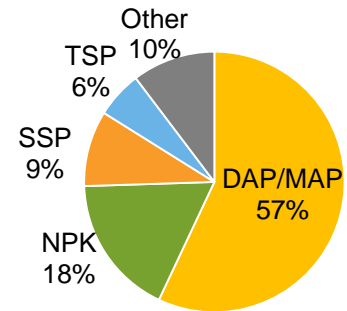
32 million tonnes

Nitrogen N



108 million tonnes\*

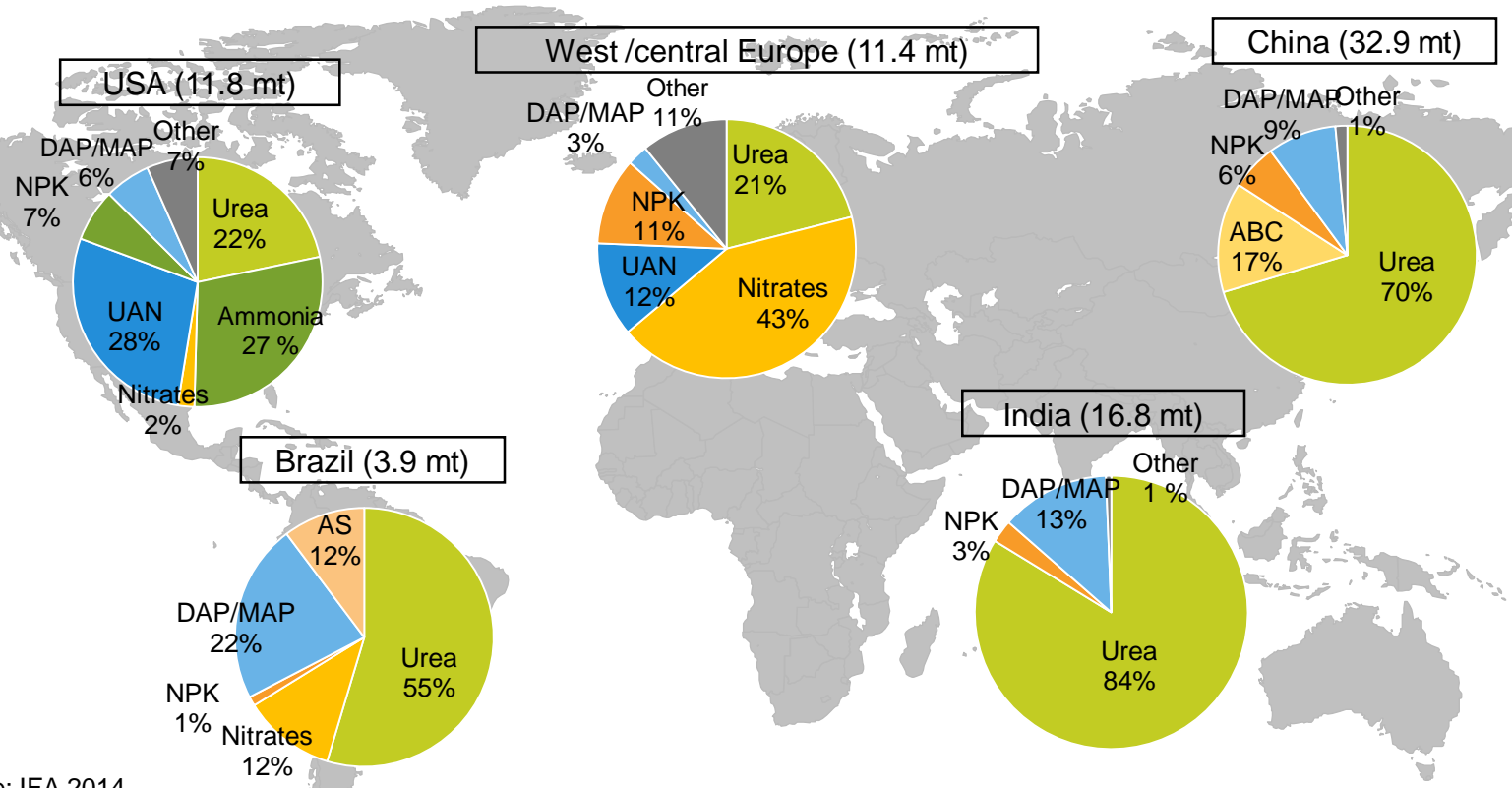
Phosphate  $P_2O_5$



41 million tonnes

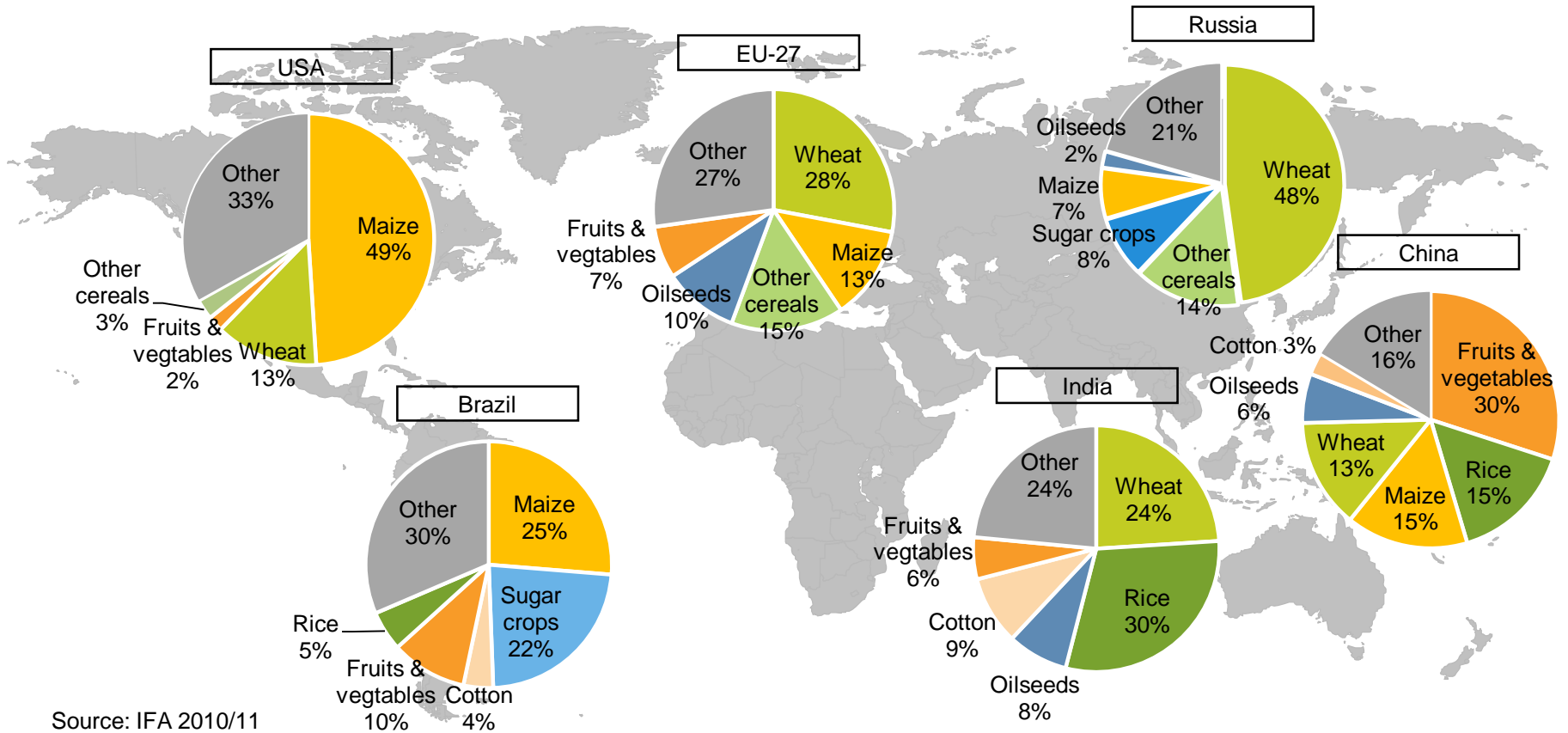
Source: IFA 2015 (nutrient totals) and 2014 (product split) \* Does not include industrial nitrogen applications

# Nitrogen fertilizer application by region and product



Source: IFA 2014

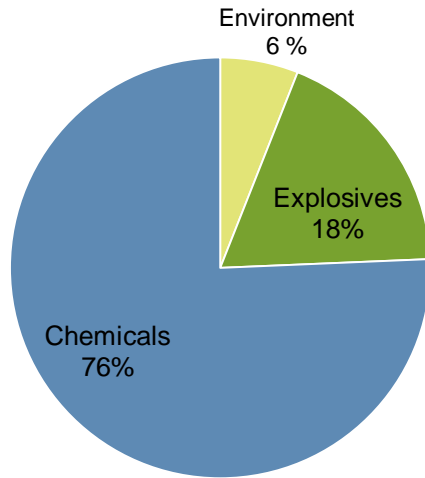
# Nitrogen fertilizer application by region and crop



Source: IFA 2010/11

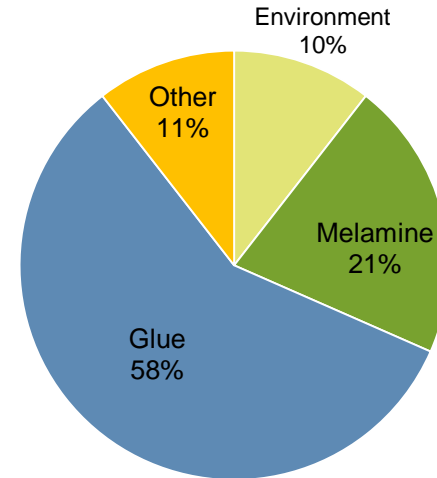
# Industrial use accounts for 21% of global nitrogen consumption

**~30 million tonnes N**



~21% of total nitrogen consumption

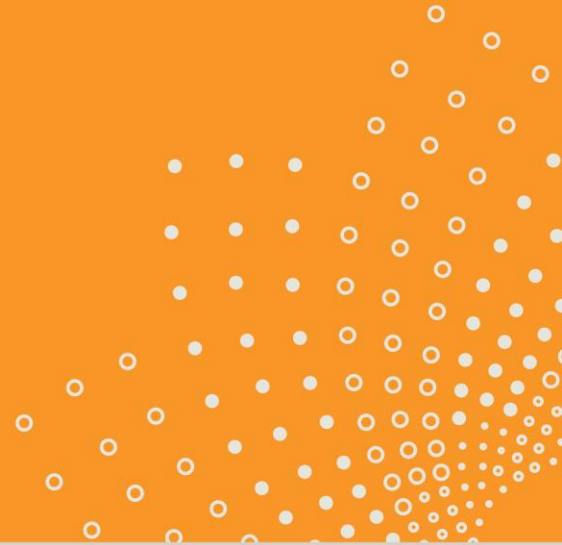
**~9.5 million tonnes N as urea**



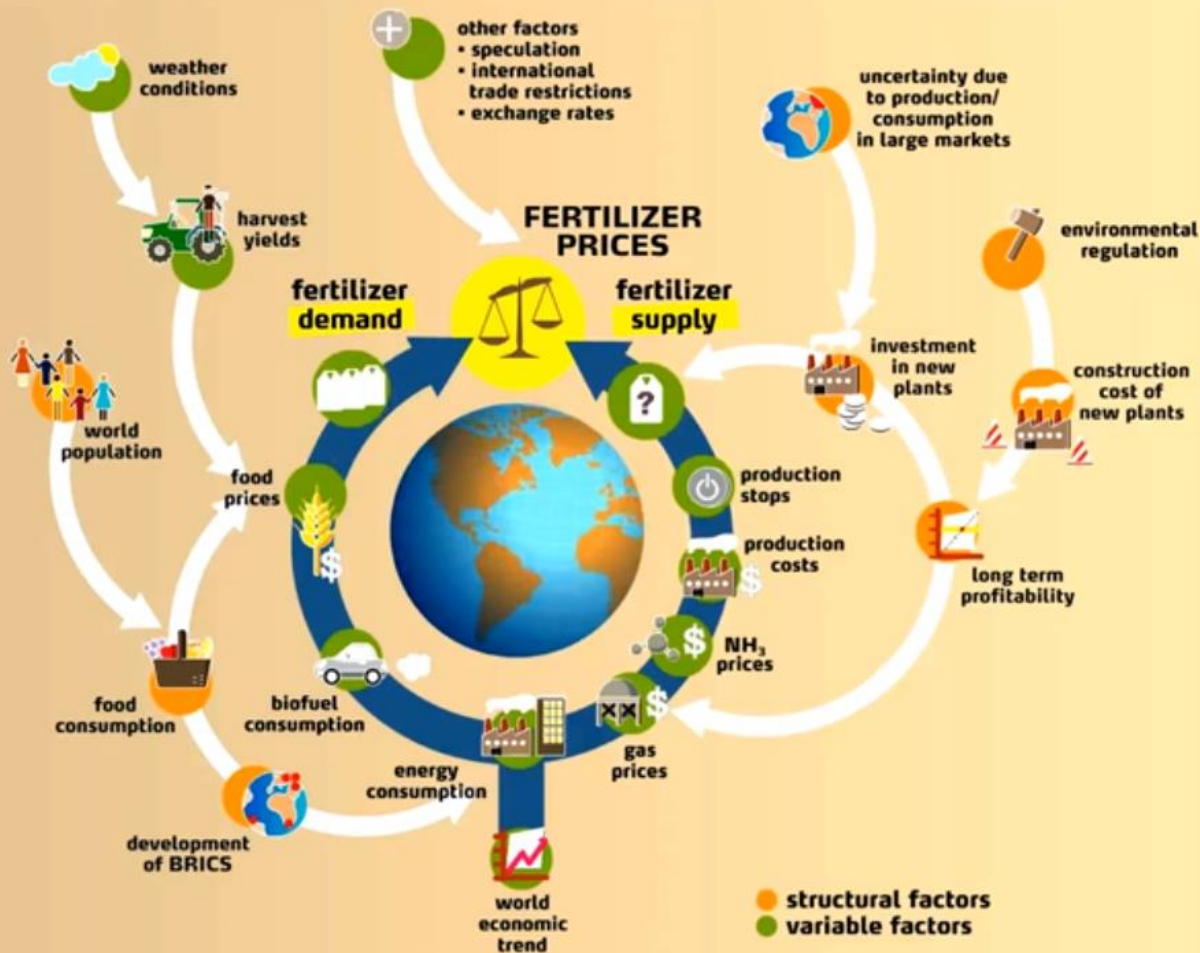
~12-13% of total urea consumption

Source: Yara estimates 2015, IFA, Fertecon, CRU

# Fertilizer Price Influencers





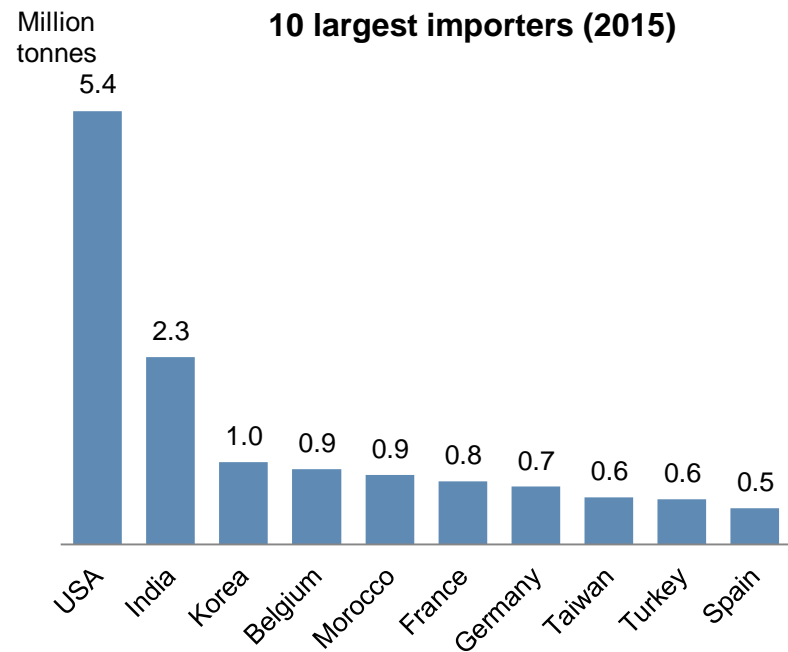
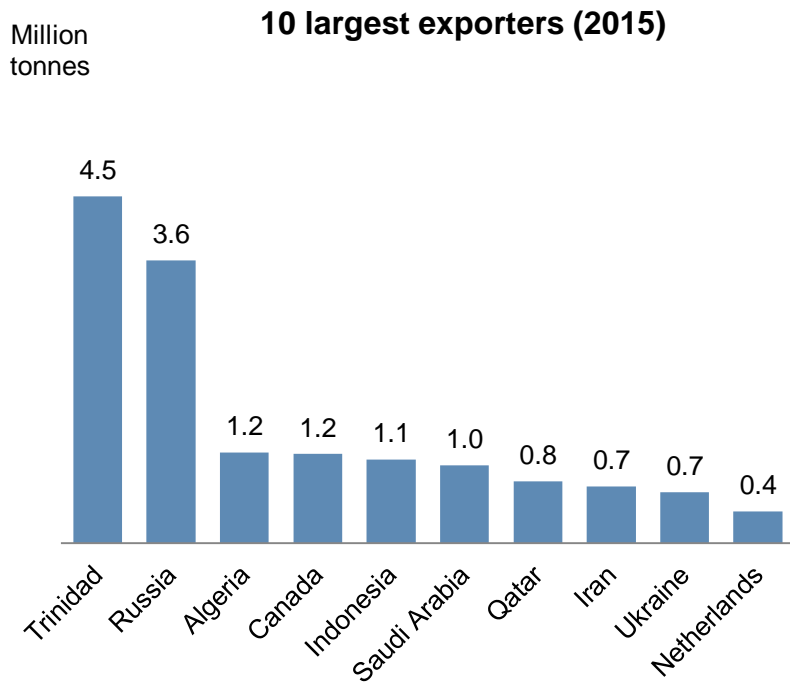


Two kinds of factors influence global demand and supply:

- Structural factors are long-term effects (e.g. world population)
- Variable factors are short-term effects (e.g. weather conditions)

As an example, we are examining how world population and world economic trend influence fertilizer prices.

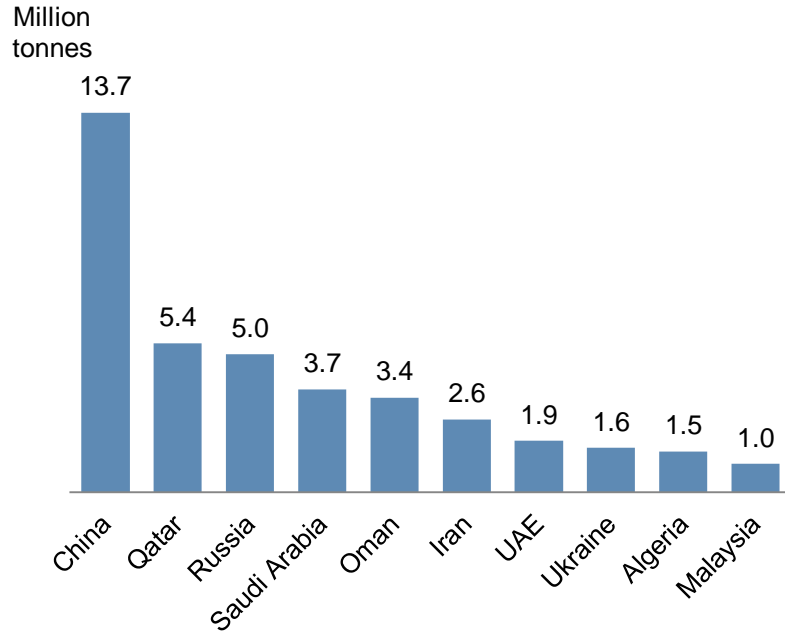
# Global ammonia trade



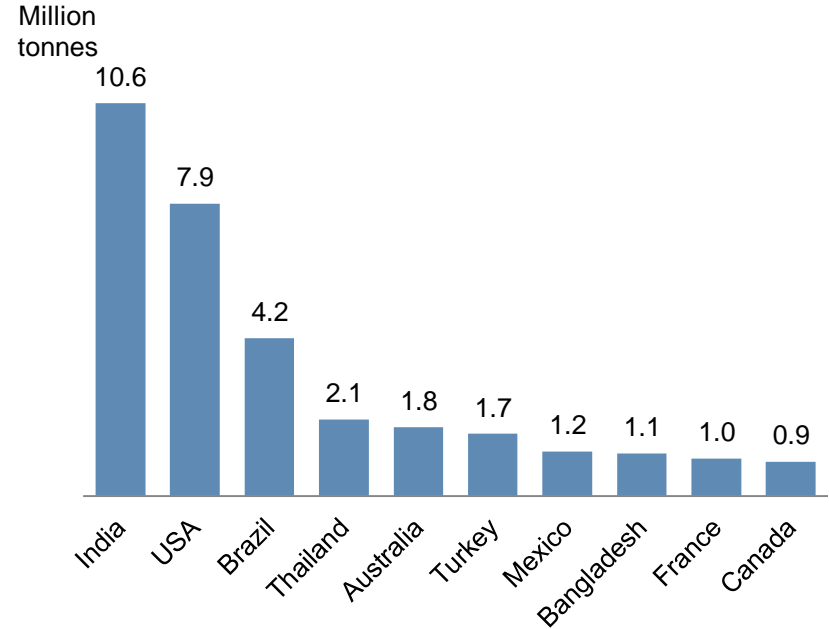
Source: IFA

# Global urea trade

## 10 largest exporters (2015)

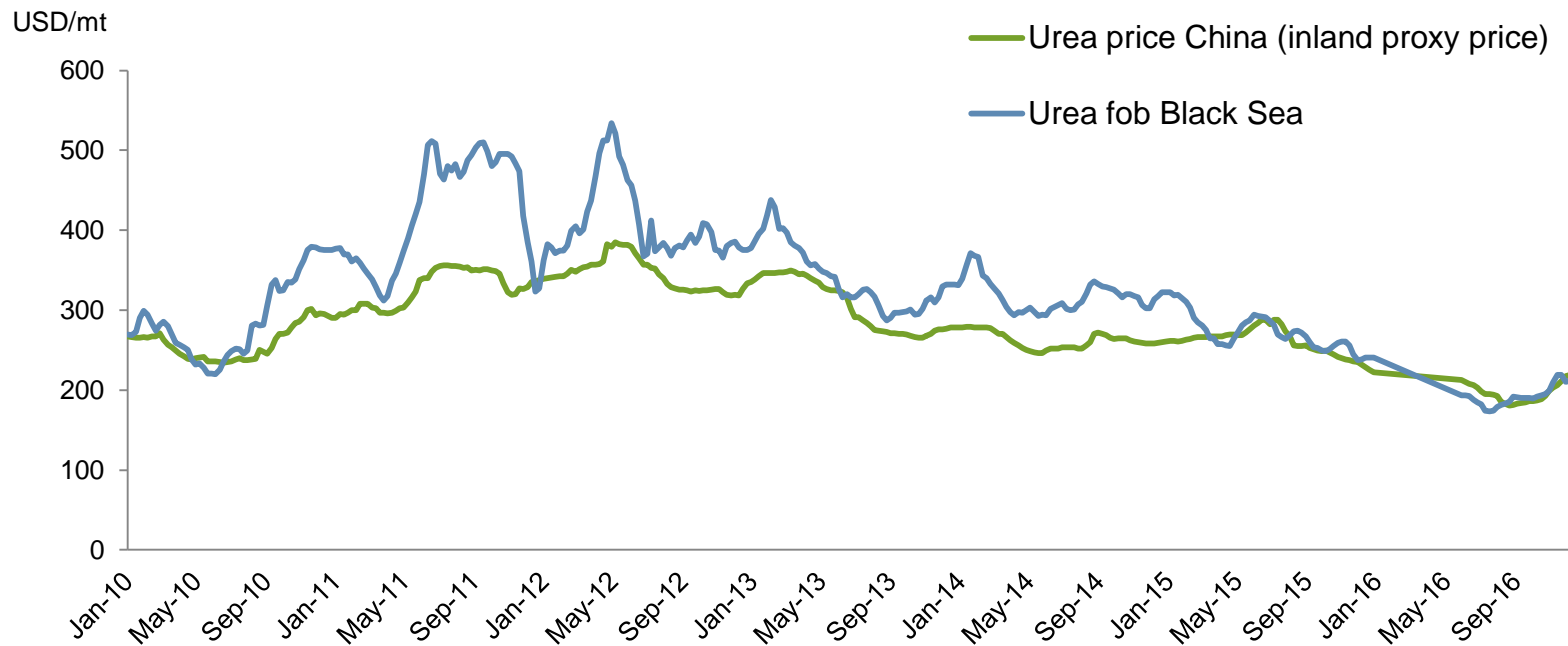


## 10 largest importers (2015)



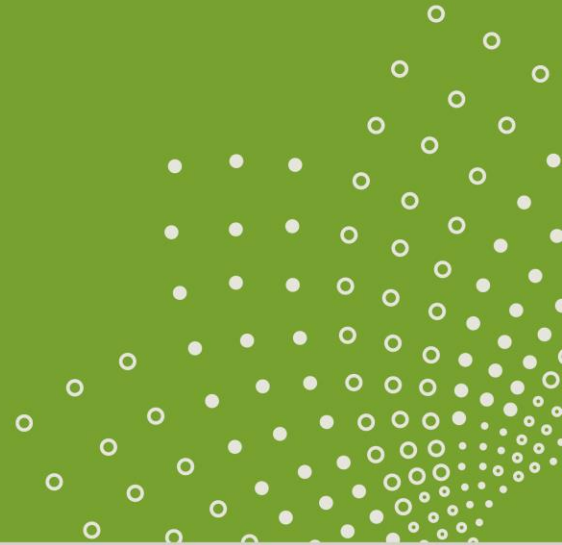
Source: IFA

# Chinese domestic urea price and export tax set the global floor price



Source: China Fertilizer Market Week, International publications

# Fertilizer Price Drivers



# Nitrogen fertilizer value drivers

	Drivers		Effect on
Market Price drivers	Chinese coal prices	➔	Supply-driven price for urea
	Grain inventories/prices	➔	Urea demand
	New urea capacity vs. closures	➔	Urea supply
	Global urea demand vs. supply	➔	Urea price (above floor)
	Urea price	➔	Most other nitrogen fertilizer prices
	Oil product prices and LNG capacity expansion	➔	Gas cost in Europe

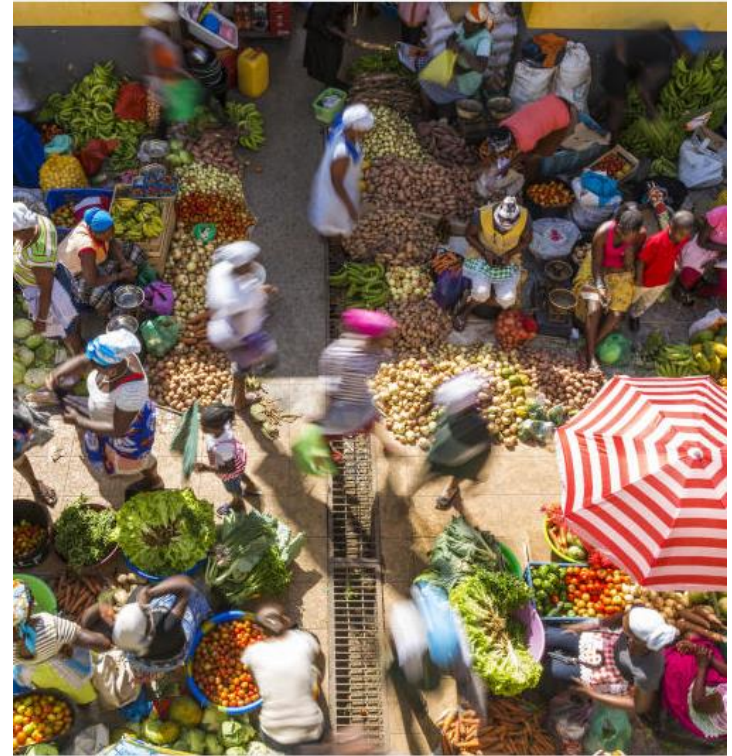
# Drivers of fertilizer consumption growth

- **Food demand drives fertilizer consumption**

- Population growth of about 80 million each year
- Economic growth change diets
  - Higher meat consumption in developing countries
  - More protein-rich diets
  - More fruit and vegetables
  - Reduce hunger
- Biofuels

- **Industrial consumption**

- Economic growth
- Environmental limits (e.g. reduction of NO<sub>x</sub> emissions)



# Price Predictors

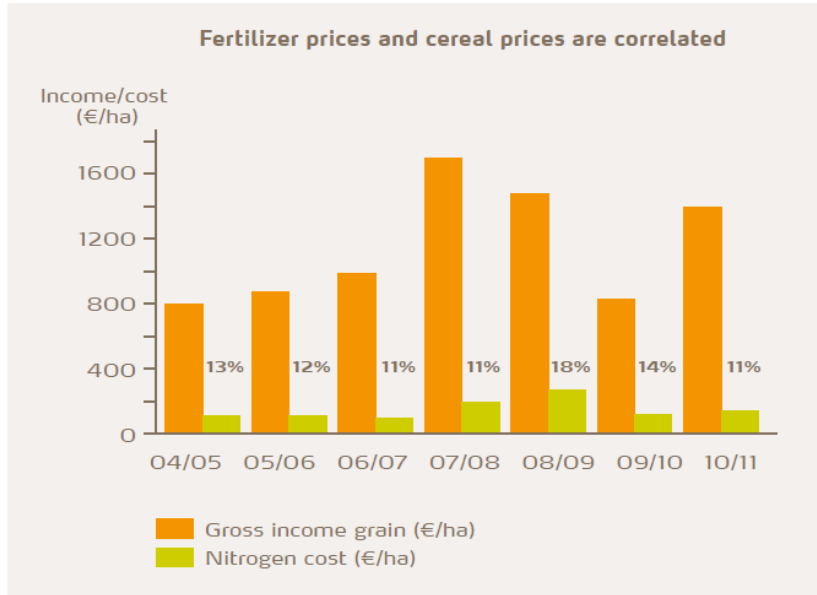


Figure 1: The increase in fertilizer prices is generally accompanied by a simultaneous increase in cereal prices. Fertilizer cost remains a fraction of gross farming income, even in inflationary periods [5].

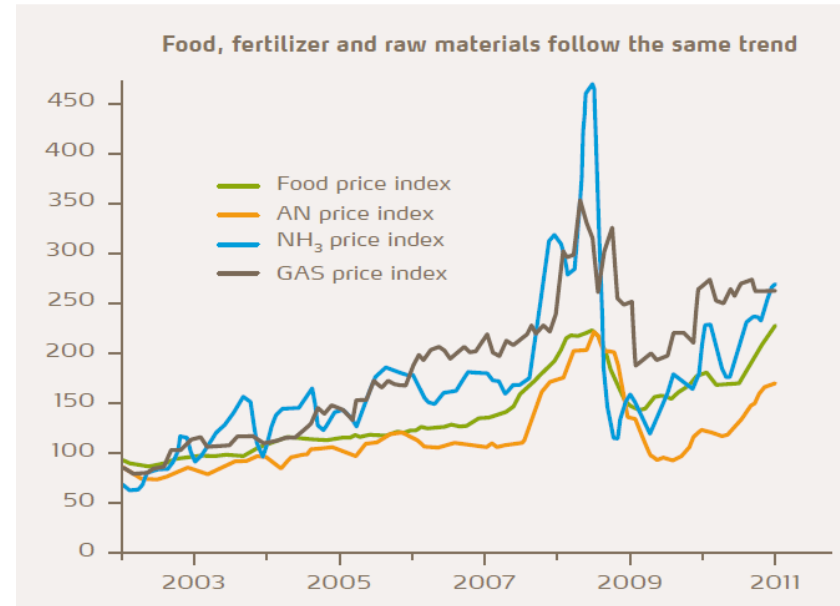
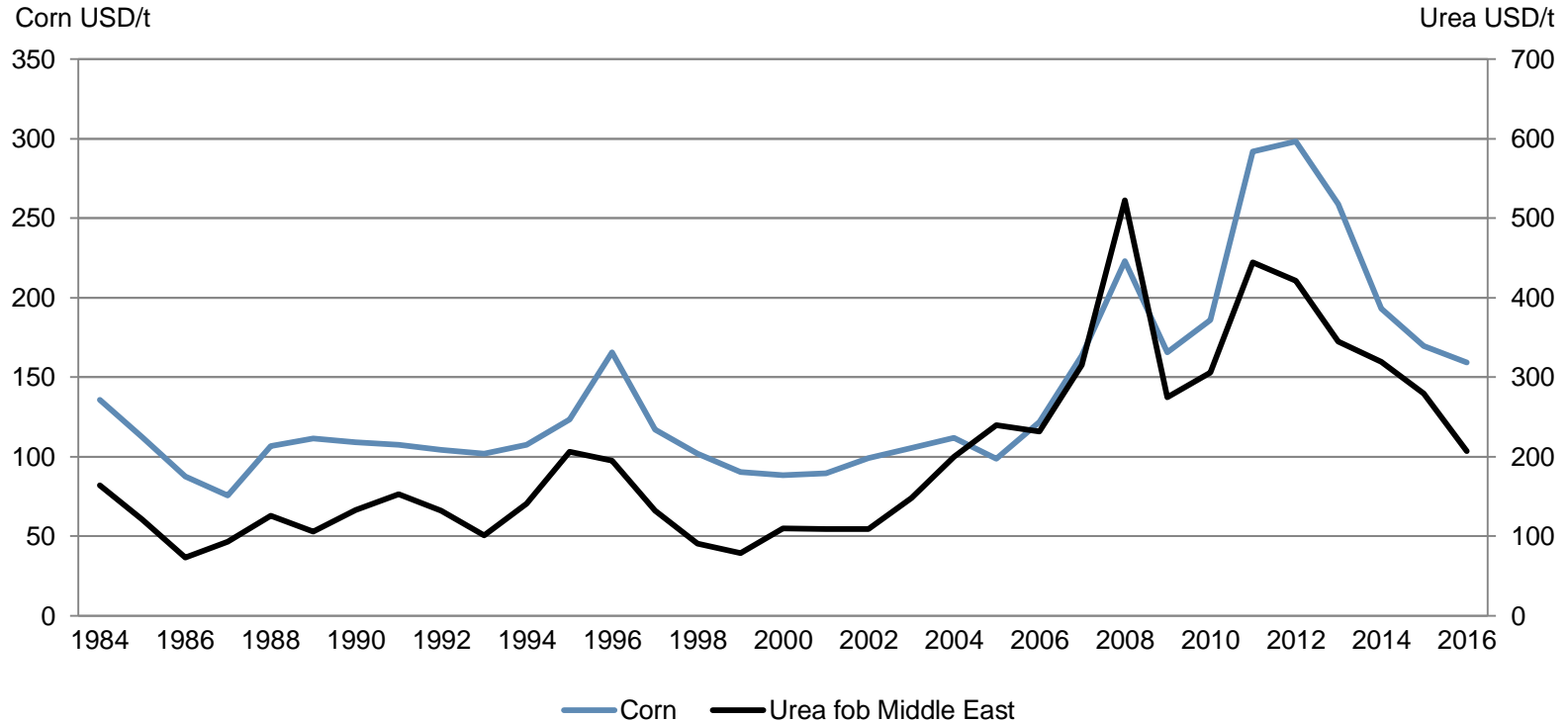


Figure 2: The prices of gas, ammonium nitrates & the FAO Food Price Index all tend to follow the same trends. The FAO Index is based on an average world market price for five product groups (meats, dairy products, cereals, oils/fats & sugar) [5].



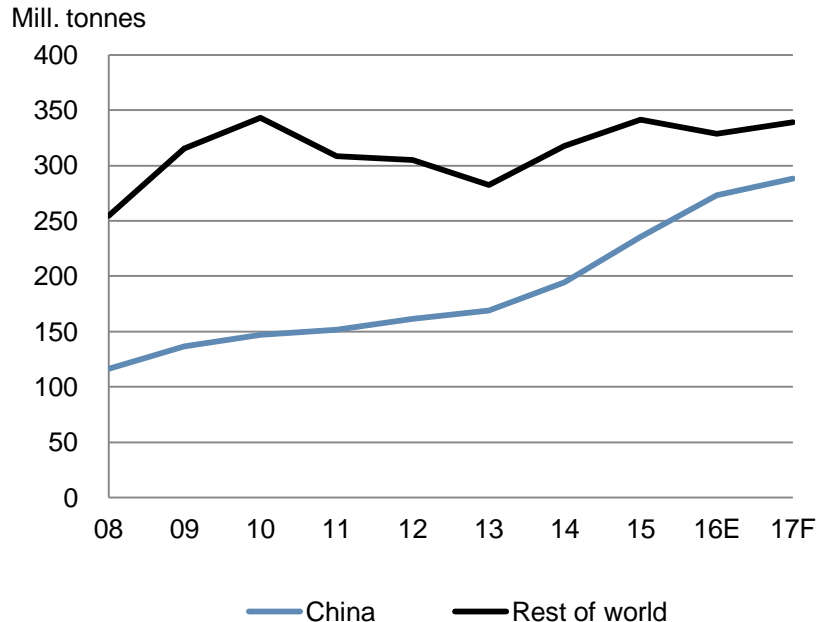
# Grain prices important for fertilizer demand



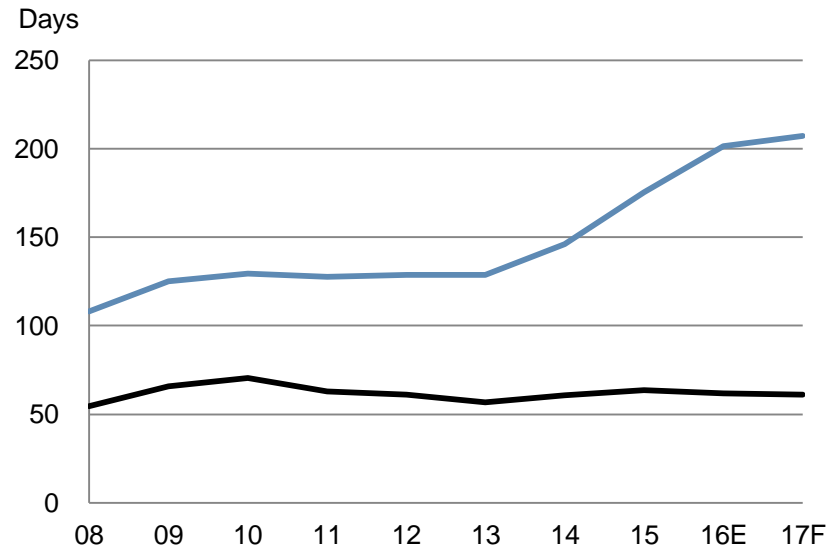
Source: World Bank, Fertilizer publications

# China drives recent years' increases in global grain stocks

## Grain stocks – China versus the rest

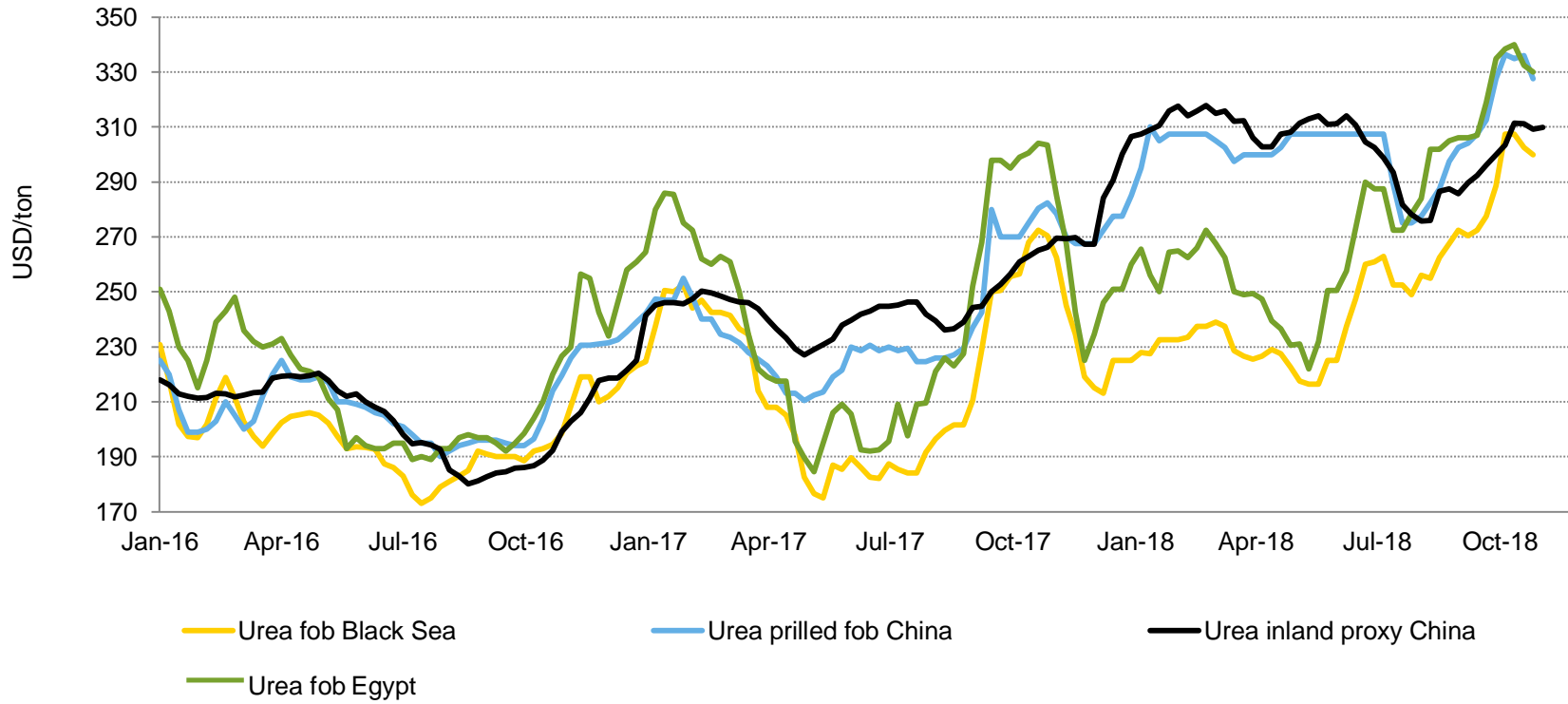


## Days of consumption in stocks



Source: USDA December 2016

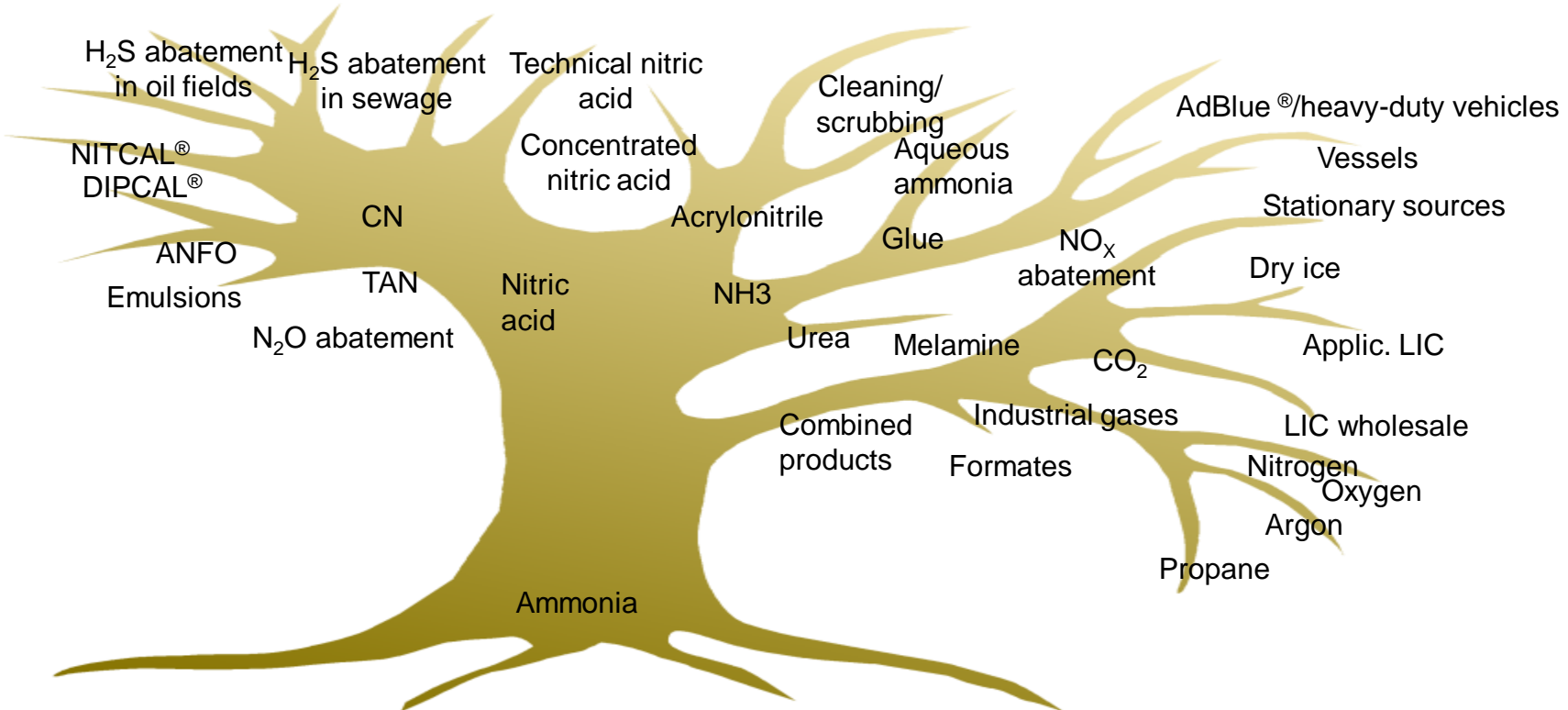
# Global pricing moving higher, pulling China along



# Final Thoughts



# Nitrogen has many industrial applications



# Fertilizer reduces the carbon footprint of farming

## Fertilizer - an efficient solar energy catalyst

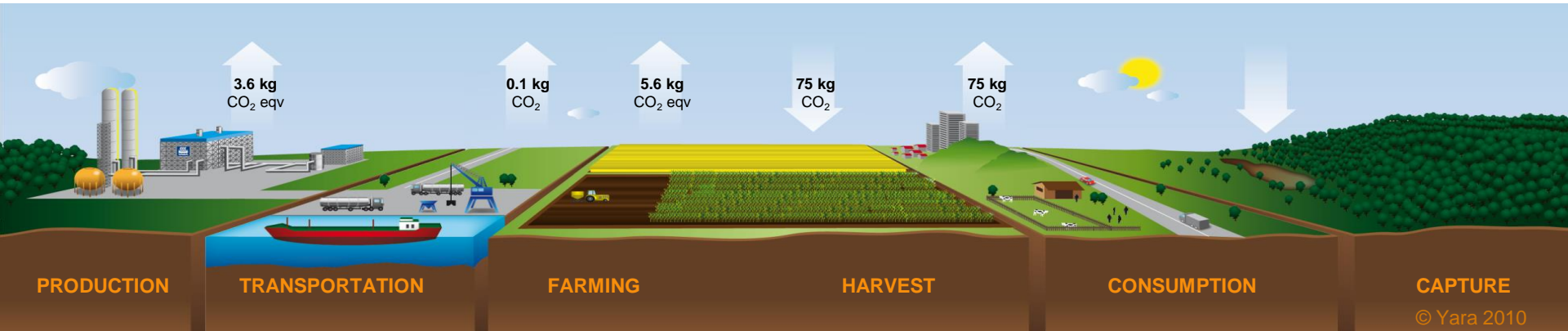
- Production is a marginal part of the carbon footprint; efficient application is more important
- Huge positive effects of fertilizer use, since higher yields enable lower land area use

### Production

- More energy-efficient than in the past (depending on place of production)

### Application

- Higher efficiency with nitrates
- Precision farming tools



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# Sources of market information

- **Fertilizer market information**
  - FMB
  - Fertecon
  - Fertilizer Week
  - Profercy
  - The Market
  - Green Markets (USA)
  - Beijing Orient Business (China)
  - China Fertilizer Market Week
- **Fertilizer industry associations**
  - International Fertilizer Industry Association (IFA)
  - Fertilizers Europe (EFMA)
- **Food and grain market information**
  - Food and Agriculture Organization of the UN
  - International Grain Council
  - Chicago Board of Trade
  - World Bank commodity prices
  - US Department of Agriculture (USDA)



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