



North America-Specialty Agriculture

Fertilizer Trends-Growth in Drip/Water Soluble

Mark D. Roeder
Sales Manager-North America

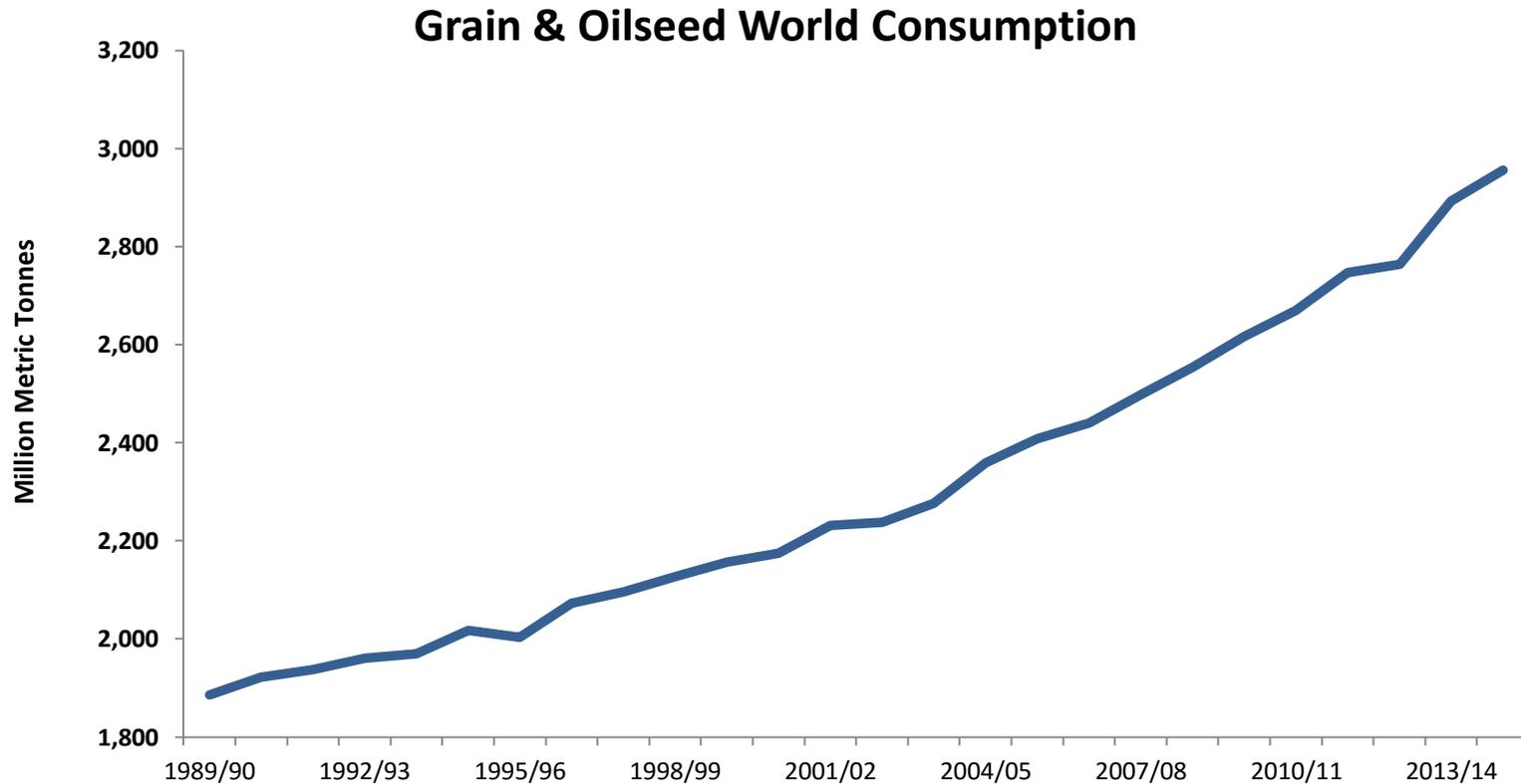
“Street Creds”

- Born and raised on a Corn and Soybean farm in Illinois
- Agronomy degree
- Grain elevator manager/trader (Co-op)
- Ag Retail Sales (Independent)
- Ag Retail Management (Independent-Major)
- Ag Retail Area Management
 - Bought and sold fertilizer (poorly at times 08-09)
- ICL North American Sales Manager Specialty Fertilizers (Global)



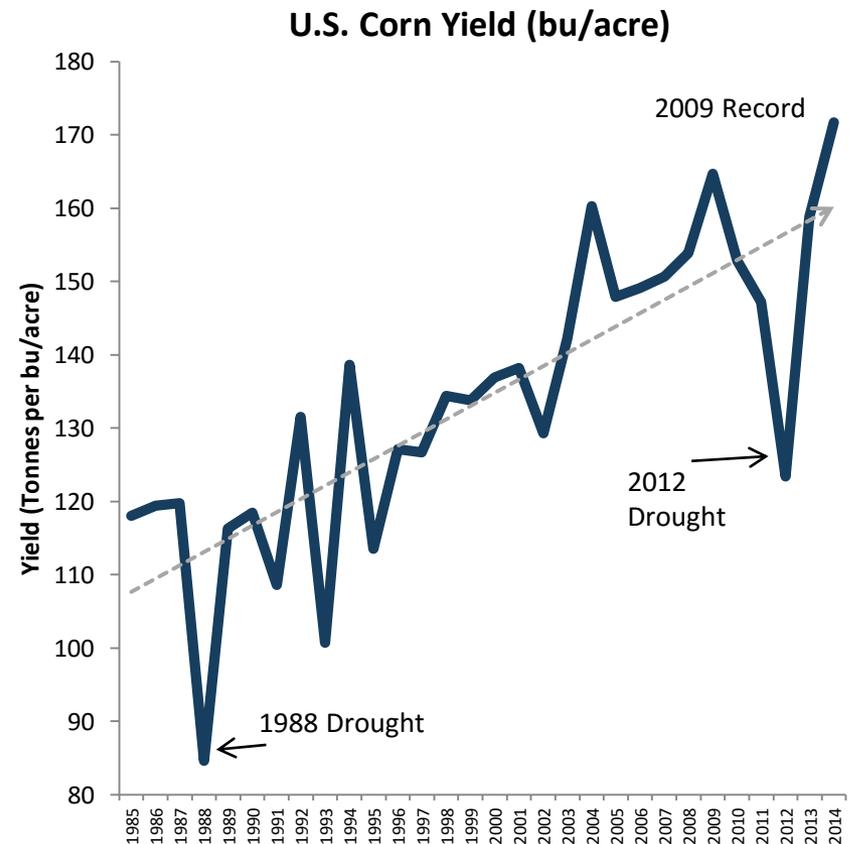
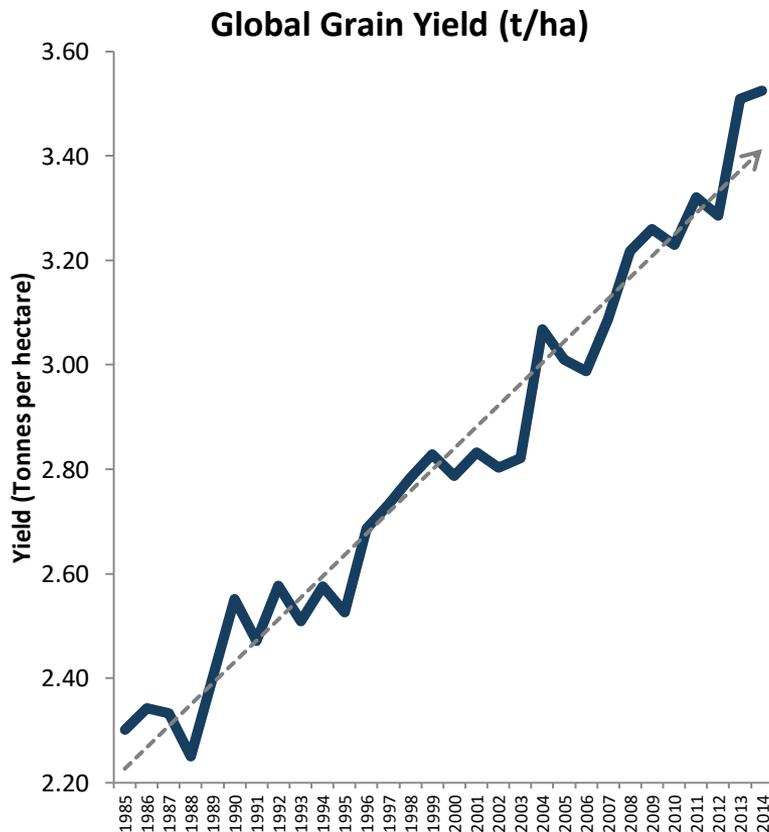
Long Term Fundamentals

- Average growth rate over past 25 years = 42 mmt/year (1.653B bu corn)
- 5 year average growth = 68 mmt/year (2.677 B bu corn)
- Record demand growth in 2013/14: = 129 mmt/year (5.078 B bu corn)



Consecutive Years of Record Global Crop Yields

- Pressure on crop prices driven by record global yields
- Crop yields and in turn global supply/demand balances often swing from year-to-year



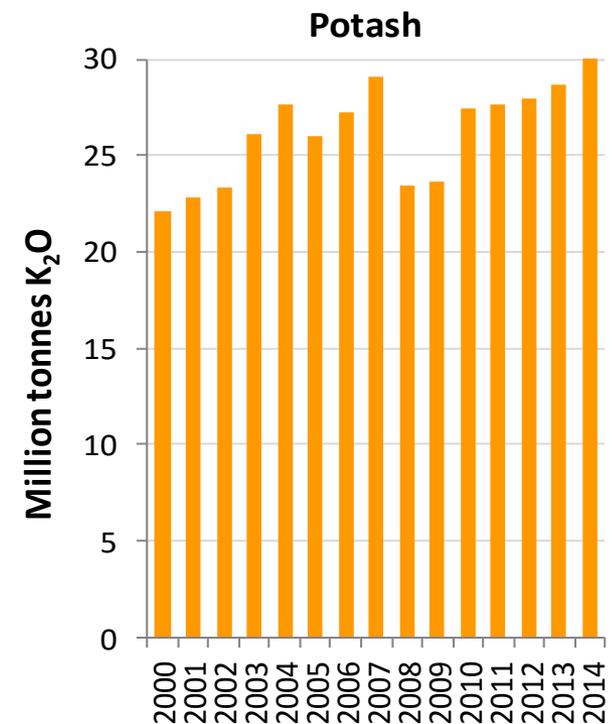
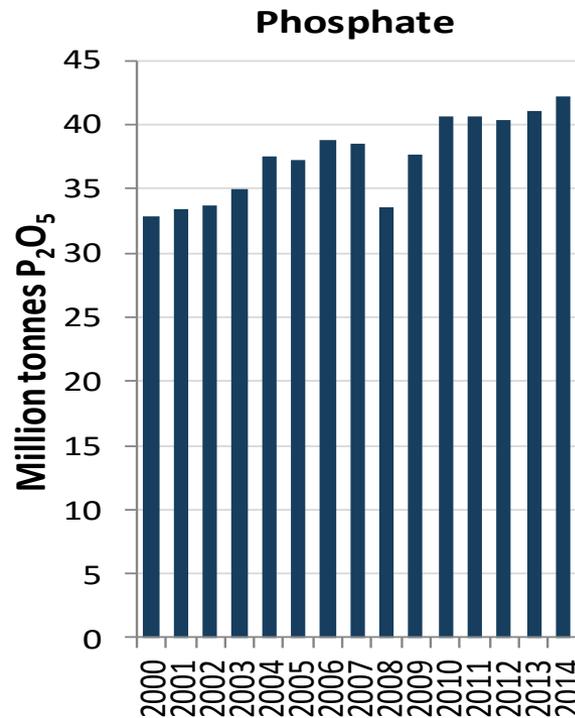
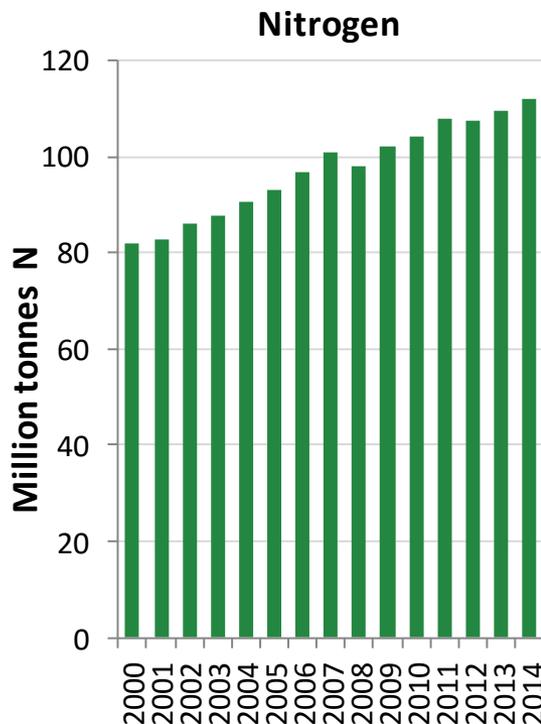
Historical Nutrient Demand

- Growth in nutrient demand is critical in order to meet global food consumption
- P and K demand growth are below historical trend over the past 4-5 years
- 2007-2013 demand trend is unsustainable (too slow)

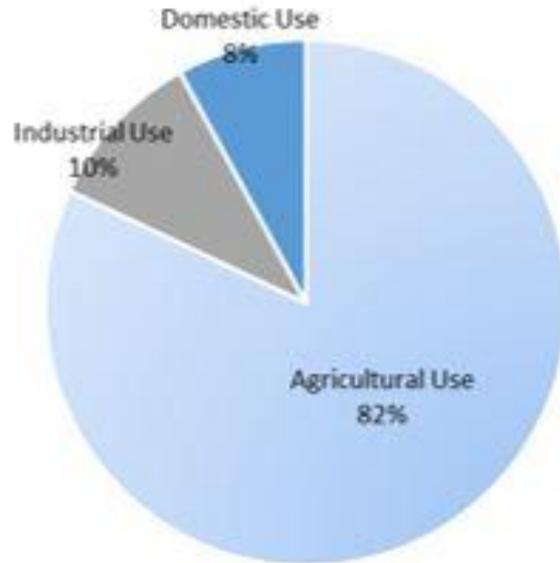
Demand Growth Rate:
 2000-07: 3.0%
 2007-12: 1.5%
2012-18f: 2.5%

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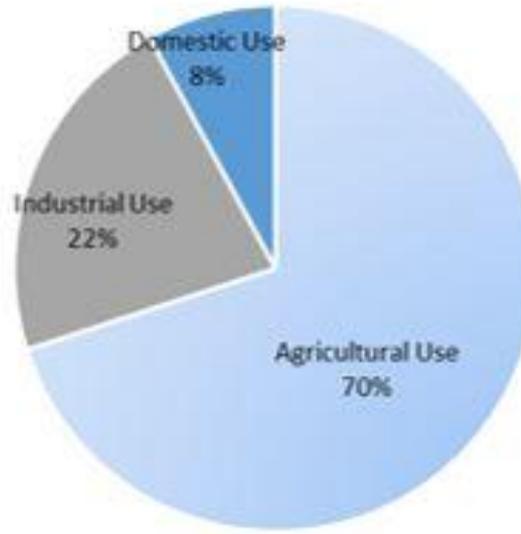
Demand Growth Rate:
 2000-07: 4.0%
 2007-12: 0.1%
2012-18f: 4.2%



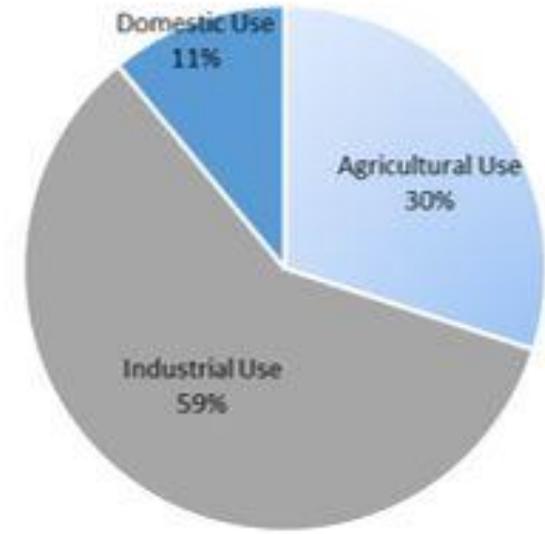
Worldwide Water Use



Developing and Poor Countries



World

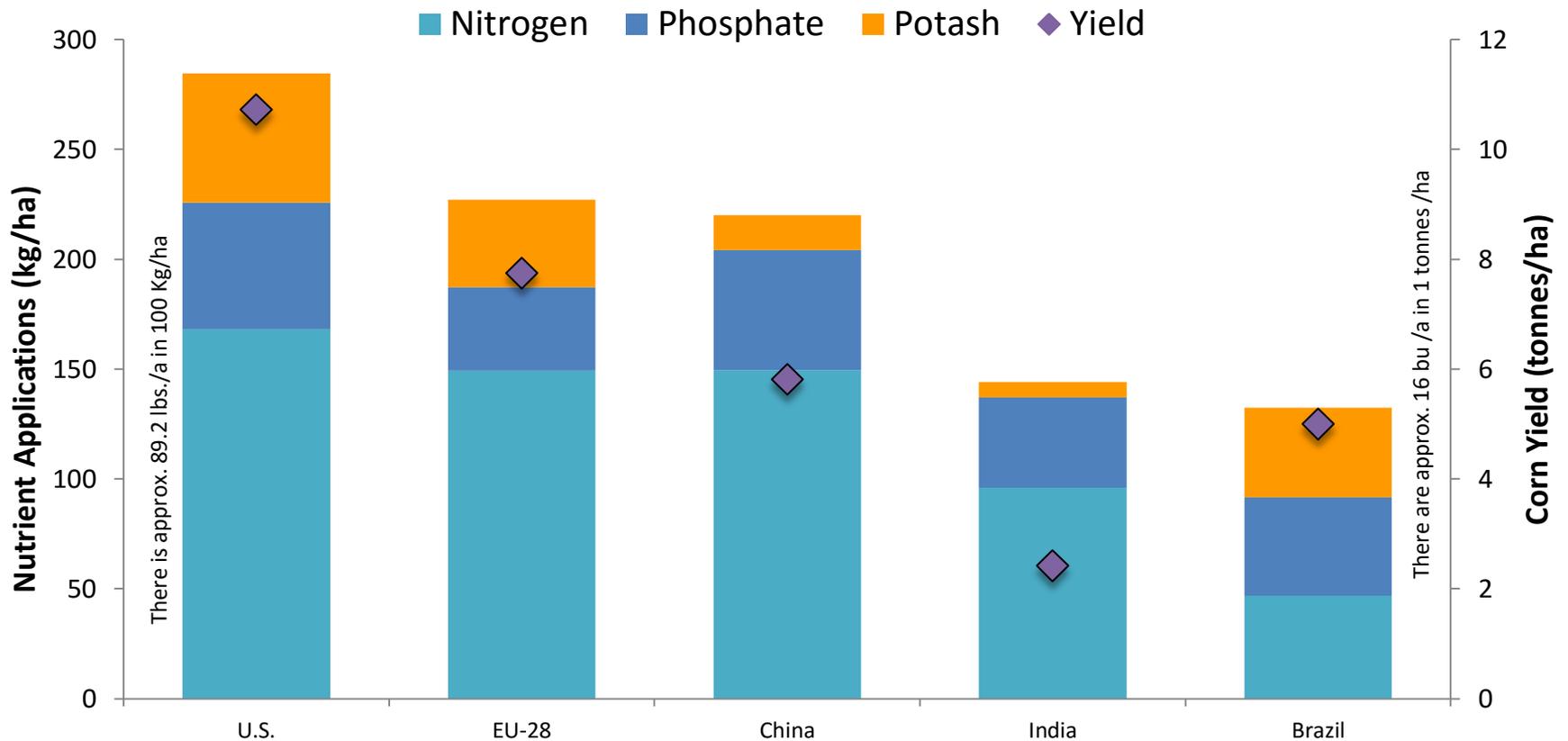


Developed Countries

Logistics?
Knowledge?

Nutrient Applications vs. Yield in Corn

- Balanced and adequate nutrient applications are important for crop yields

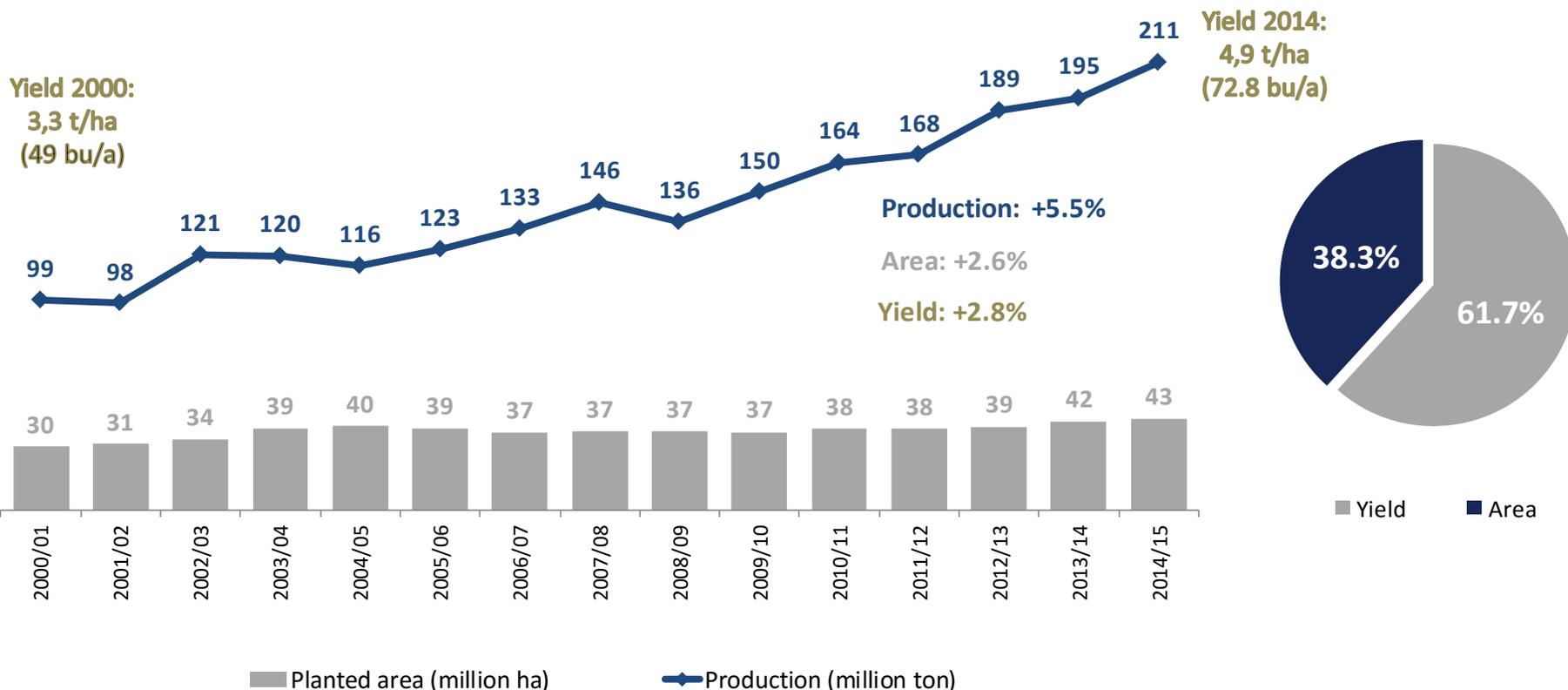


Agribusiness Evolution: Production and Area

Grains* (1/2)

Most part of the Brazilian success can be explained by the relevant growth in grain production, which occurred both through better yields performance and area expansion.

Grains: Evolution in Planted Area, Total Production and Yields



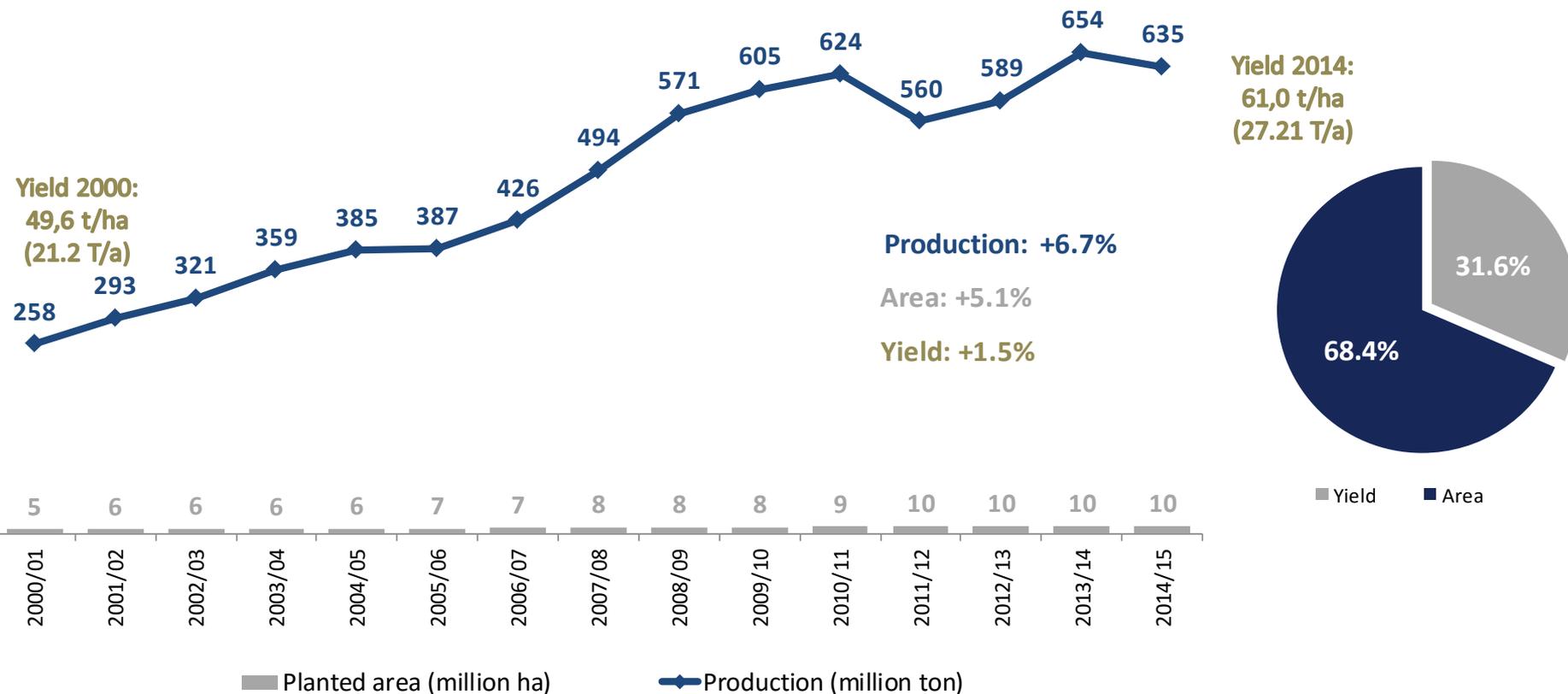
* Include: Soybean, Corn, Wheat, Rice, Peanut 1^a harvest; Peanut 2^a harvest; Oatmeal; Cotton; Barley; Castor Beans; Rye; Sorghum; Sunflower; Triticale; Bean 1^a harvest; Bean 2^a harvest; Bean 3^a harvest. Source: Conab. Elaboration: Agroconsult

Agribusiness Evolution: Production and Area

Sugarcane

Sugarcane has also benefited from productivity gains, as total production grew at a higher rate than the planted area.

Sugarcane: Evolution in Planted Area, Total Production and Yields

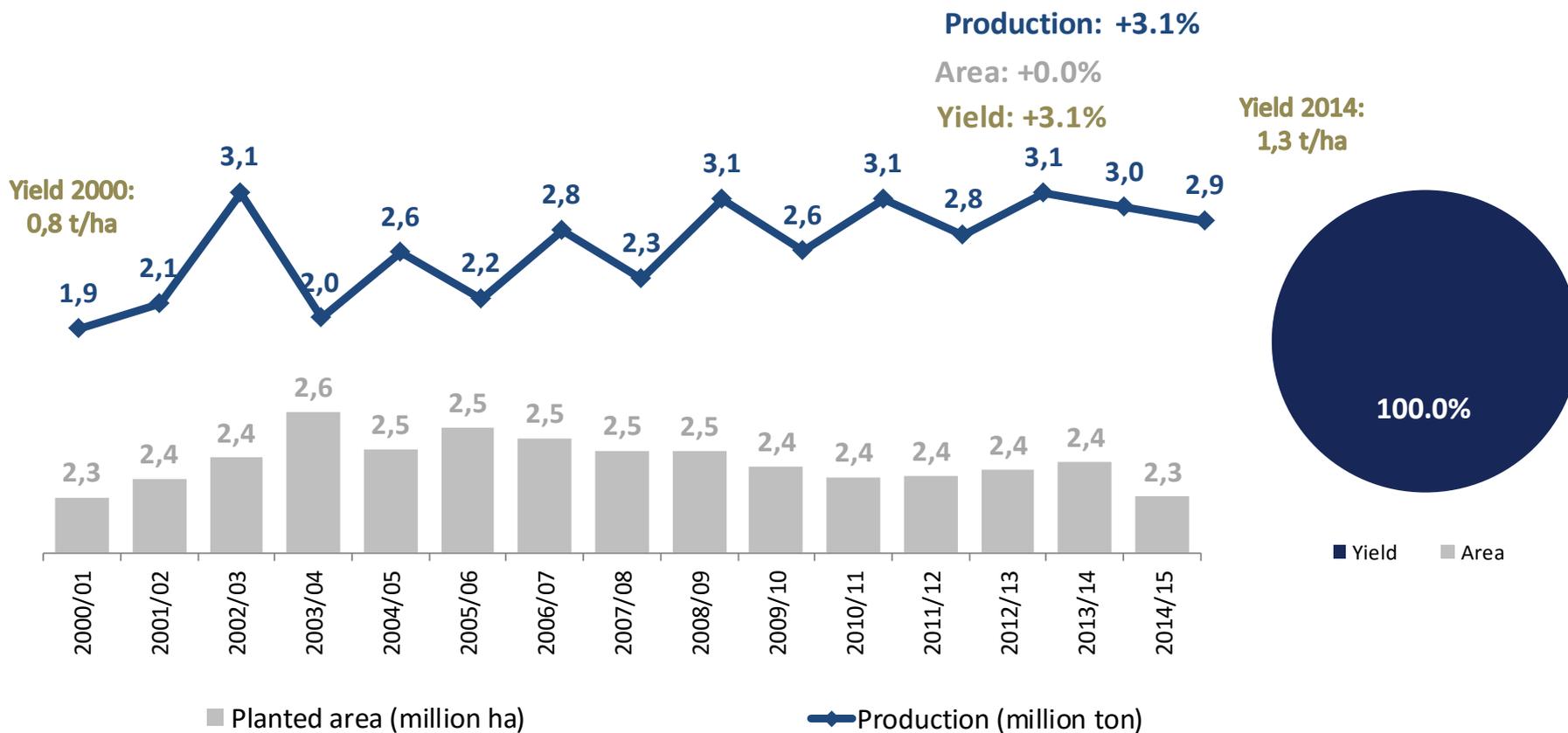


Agribusiness Evolution: Production and Area

Coffee

For coffee, productivity gains were even more essential for production increase, which occurred even with a drop in cultivated area.

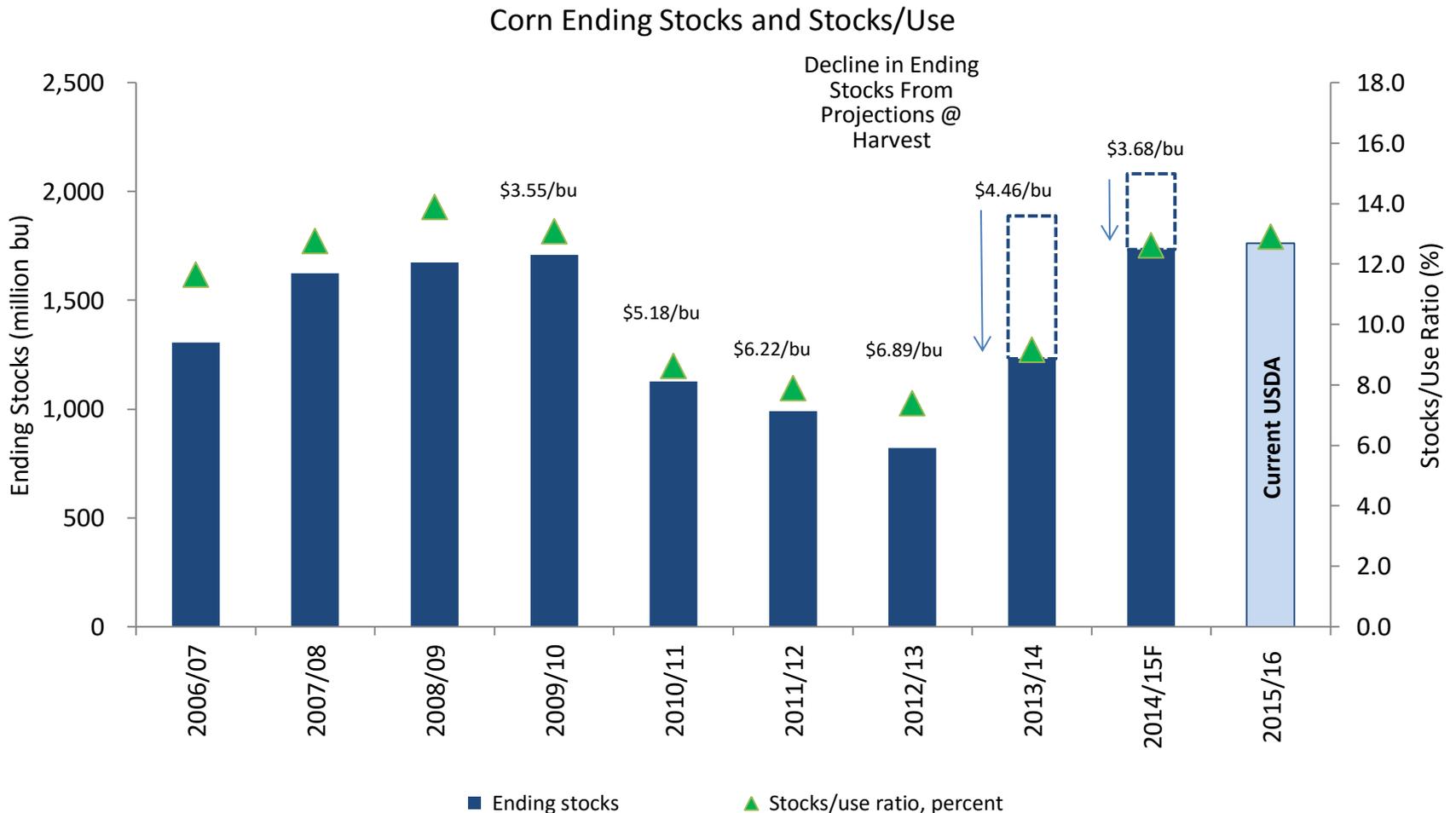
Coffee: Evolution in Planted Area, Total Production and Yields



Corn Prices are Highly Sensitive to Yield Changes

→ Which Were driving fertilizer pricing

- U.S. corn supply/demand balance has tightened through the year in the past 2 crop years

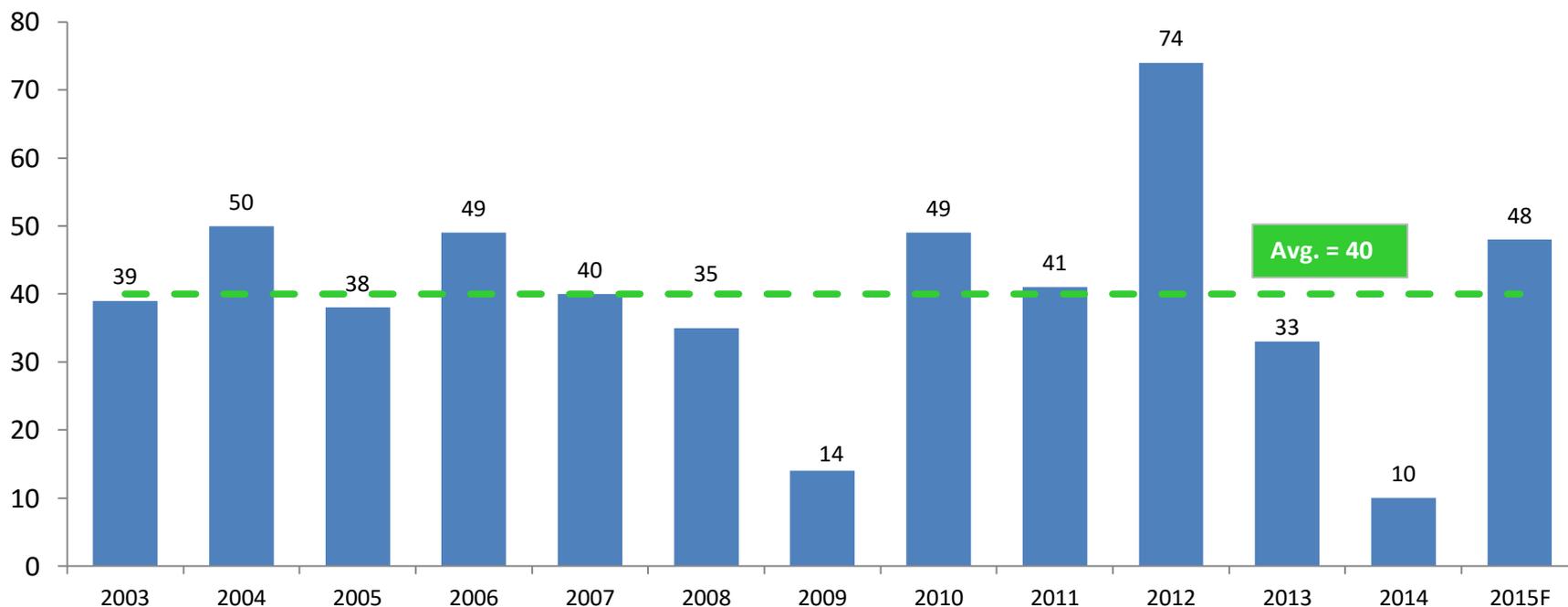


* Source: USDA, FactSet, Agrium

Long 2015 Fall Season to Support Nutrient Use

- NPK fall applications in Q4 will be supported by a season that started significantly earlier than last year and assuming a more normal close to the season, compared to the early close in 2014

Proxy Fall Application Season Length (# of days)*



*The proxy fall season length is the number of days between U.S. corn harvest reaching 75% complete and U.S. continental snowfall coverage reaching 50%. For 2015, the long-term average date of continental snowfall reaching 50% was used.

Green Markets 11-2-2015

David Coppess, executive vice president, sales and marketing, for Heartland Co-op; *growers have no confidence in fertilizer prices going forward and want to end the fall application season with empty bins. Coppess also reported a lot of interest in specialty fertilizer products at the retail level as growers seek to optimize nutrient uptake and reduce reliance on traditional fertilizers.*

there will be a shift to more spring-applied urea and UAN over anhydrous ammonia, particularly as growers face increasing regulatory and environmental pressures.

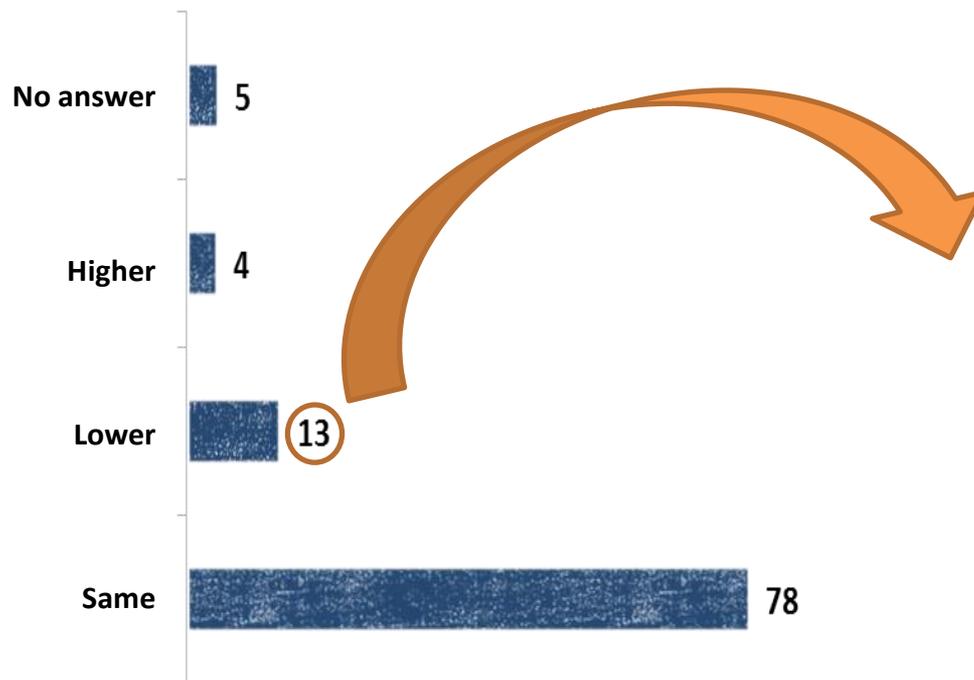
Green Markets 11-23-2015

Weather was not the only difference a year makes, as most commodity fertilizer prices were lower in November 2015 versus November 2014 (see pp. 4-5), *though specialty fertilizers appeared to be holding their own.*

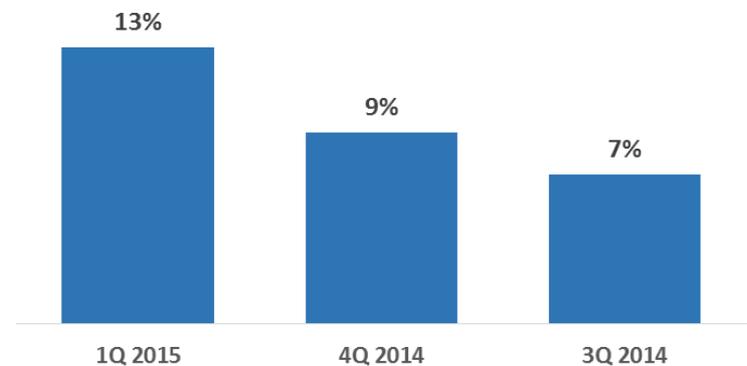
Fertilizer Usage: Farmers' Expectation

According to ICAgro survey, farmers were willing to maintain fertilizer dosage for the 2015/16 Crop Season.

Fertilizer Dosage for the Next Season (2Q 2015 Results) - %

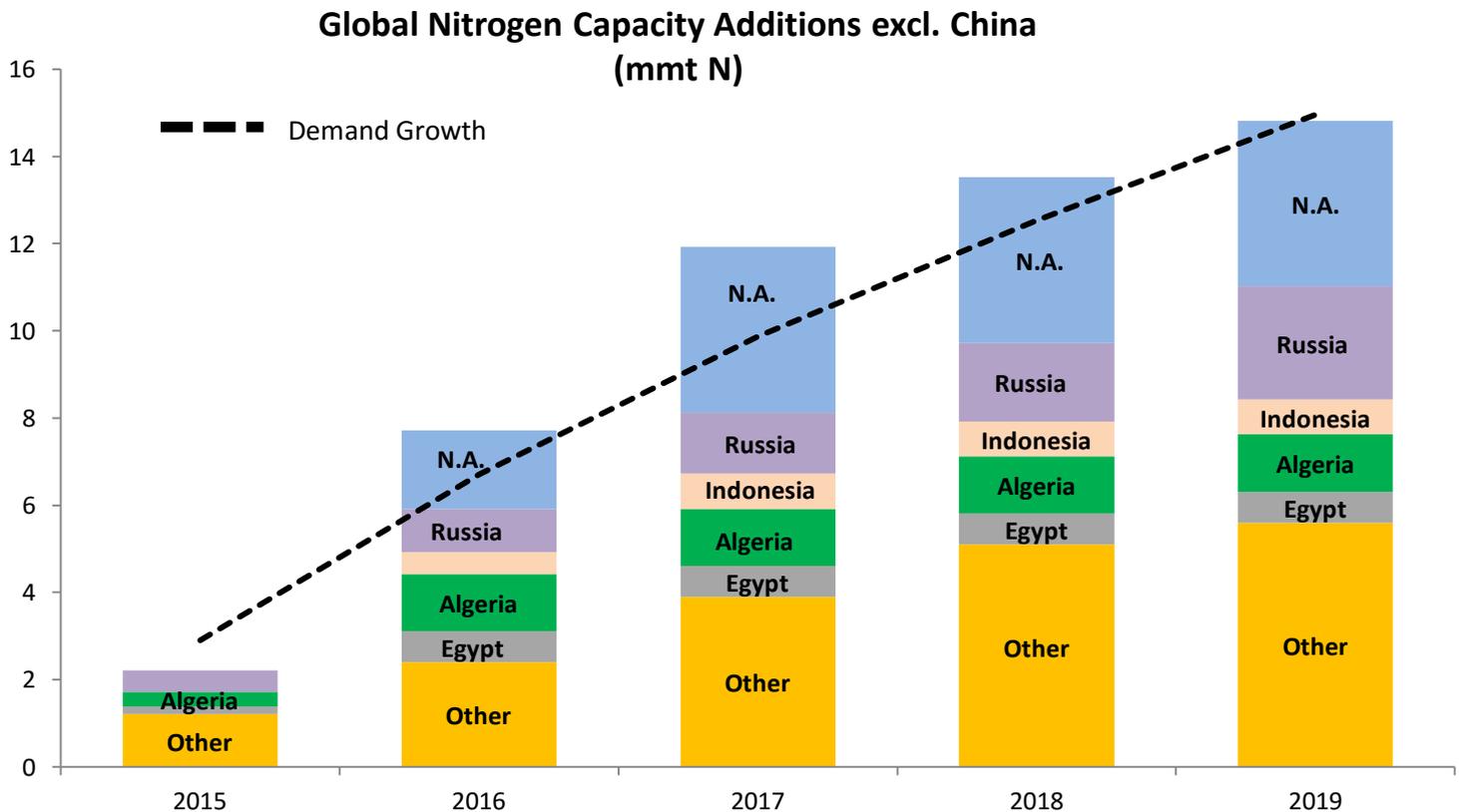


Are you going to decrease Fertilizer Dosage for the Next Season? (Previous Results) - %



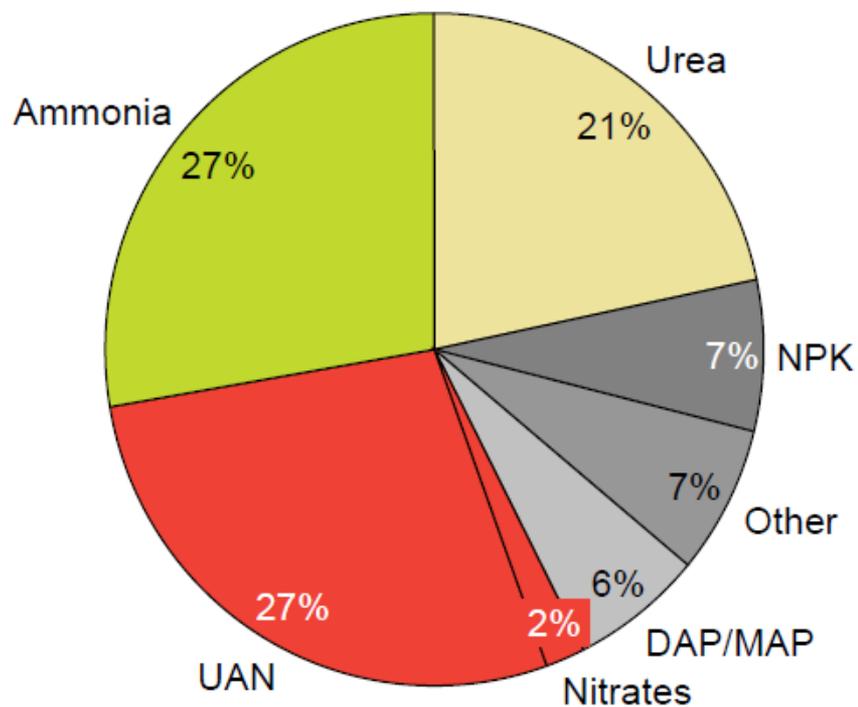
Global Nitrogen Capacity & Demand Growth

- Most of the increased global capacity is expected in 2016 and 2017
- Chinese capacity expansions are projected to slow after 2016

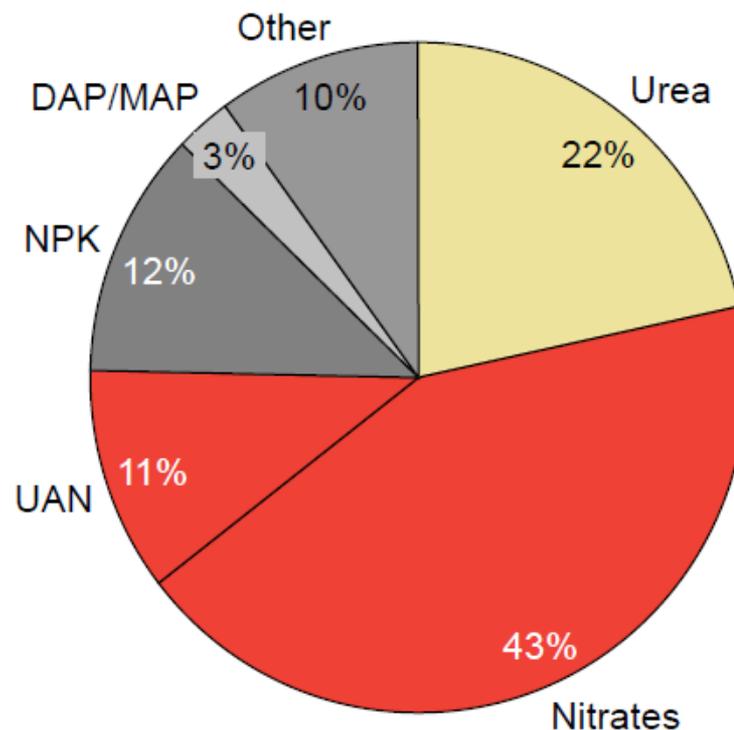


Source: CRU, Fertecon, IFA, Agrium

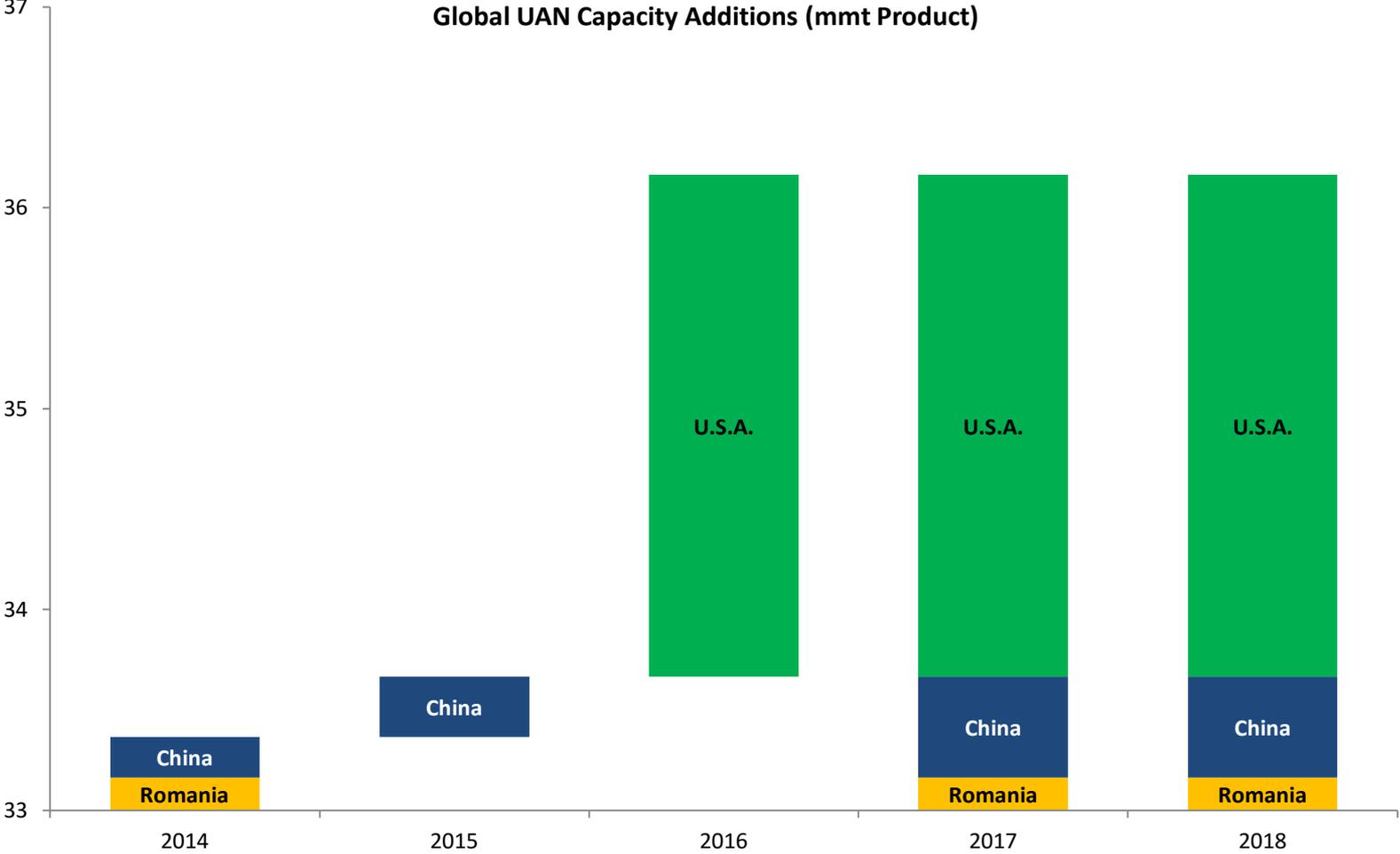
US nitrogen demand



European nitrogen demand

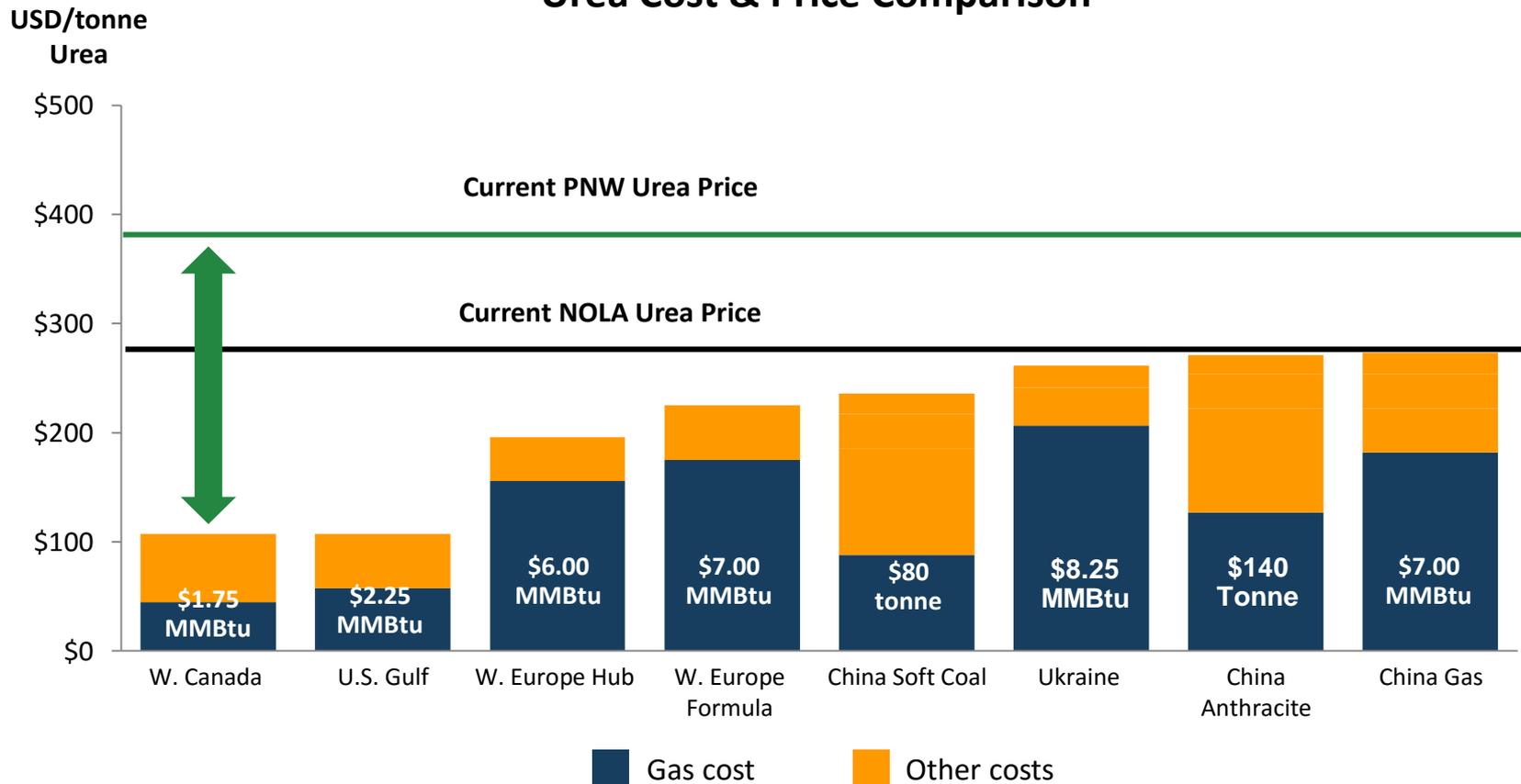


Global UAN Capacity Additions



Current Urea Prices Near Cost-Based Floor

Urea Cost & Price Comparison

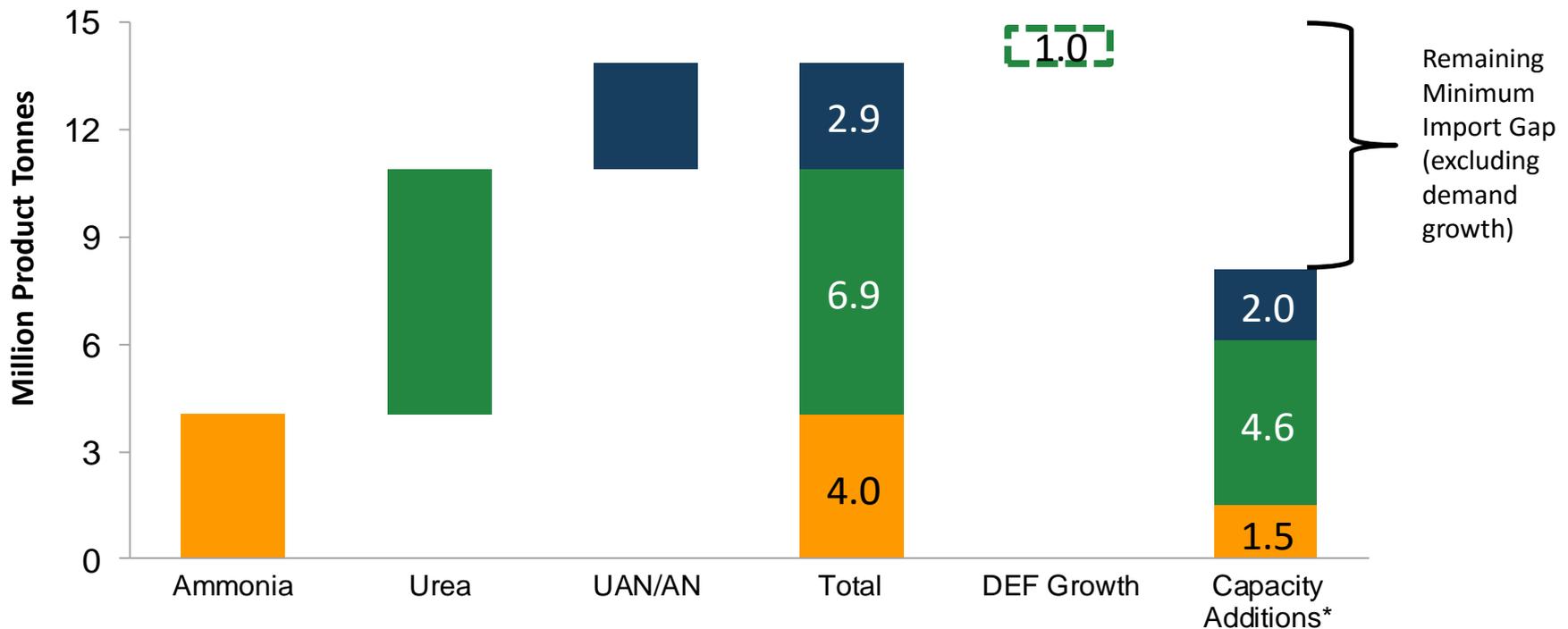


Global urea cost floor has been driven by the cost of anthracite-coal based production in **China**

Other costs include other cash production costs, and freight to port and export taxes where applicable. Ocean freight is excluded.
 Source: Fertecon, CRU, Agrium

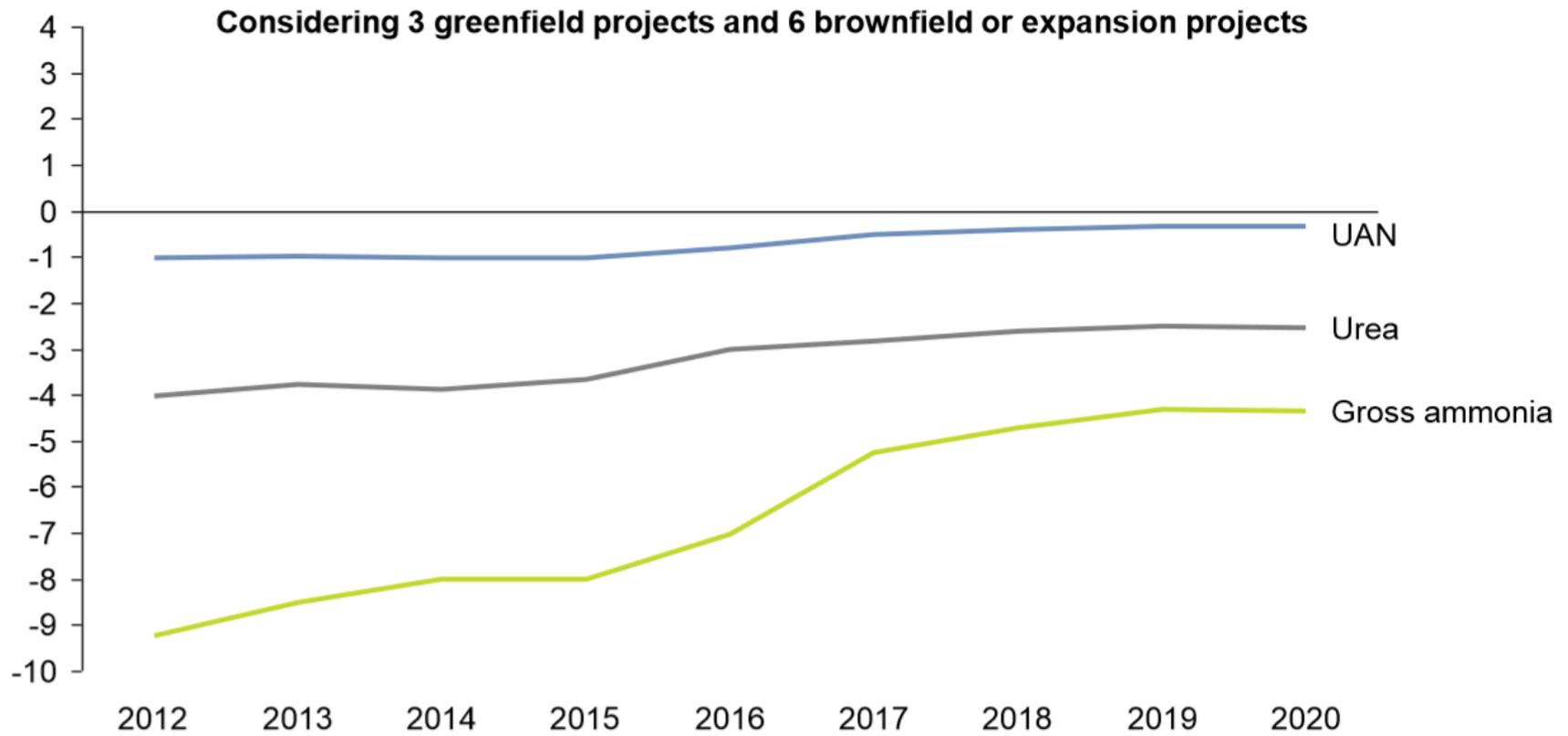
U.S. Nitrogen Offshore Imports

- U.S. offshore imports accounted for over **50%** of U.S. nitrogen consumption in 2014
- Probable U.S. nitrogen projects lower the import proportion to **~25%**
- Another **~\$15B** of investment required to meet the remaining import gap
- **~27%** of U.S. nitrogen production located in the US Gulf, helps sustain premiums in interior major growing regions



Source: U.S. Dept. of Commerce, Zepol, Integer, Agrium

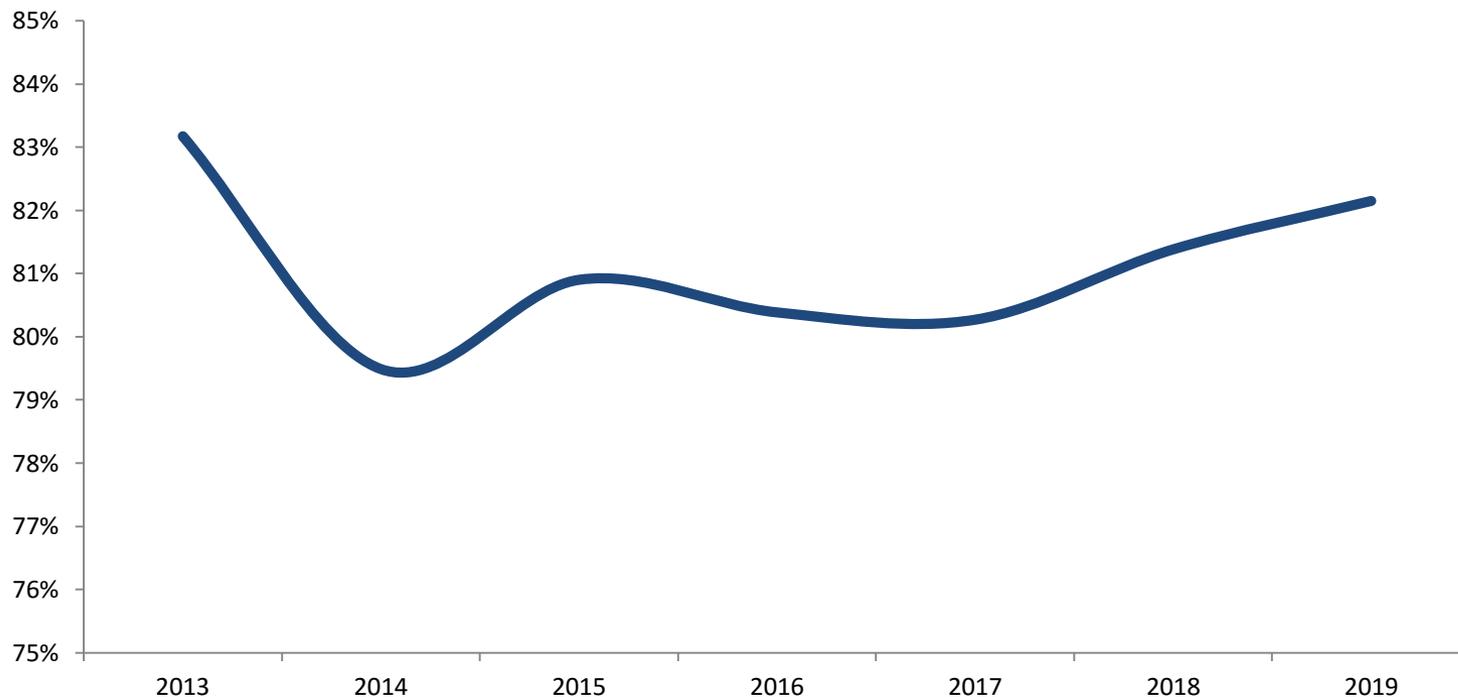
*Includes Agrium Borger, CF Donaldsonville, CF Port Neal, Dyno, Yara/BASF, OCI, Koch, Dakota Gas, Simplot and some other minor projects



Global Nitrogen Capacity Utilization

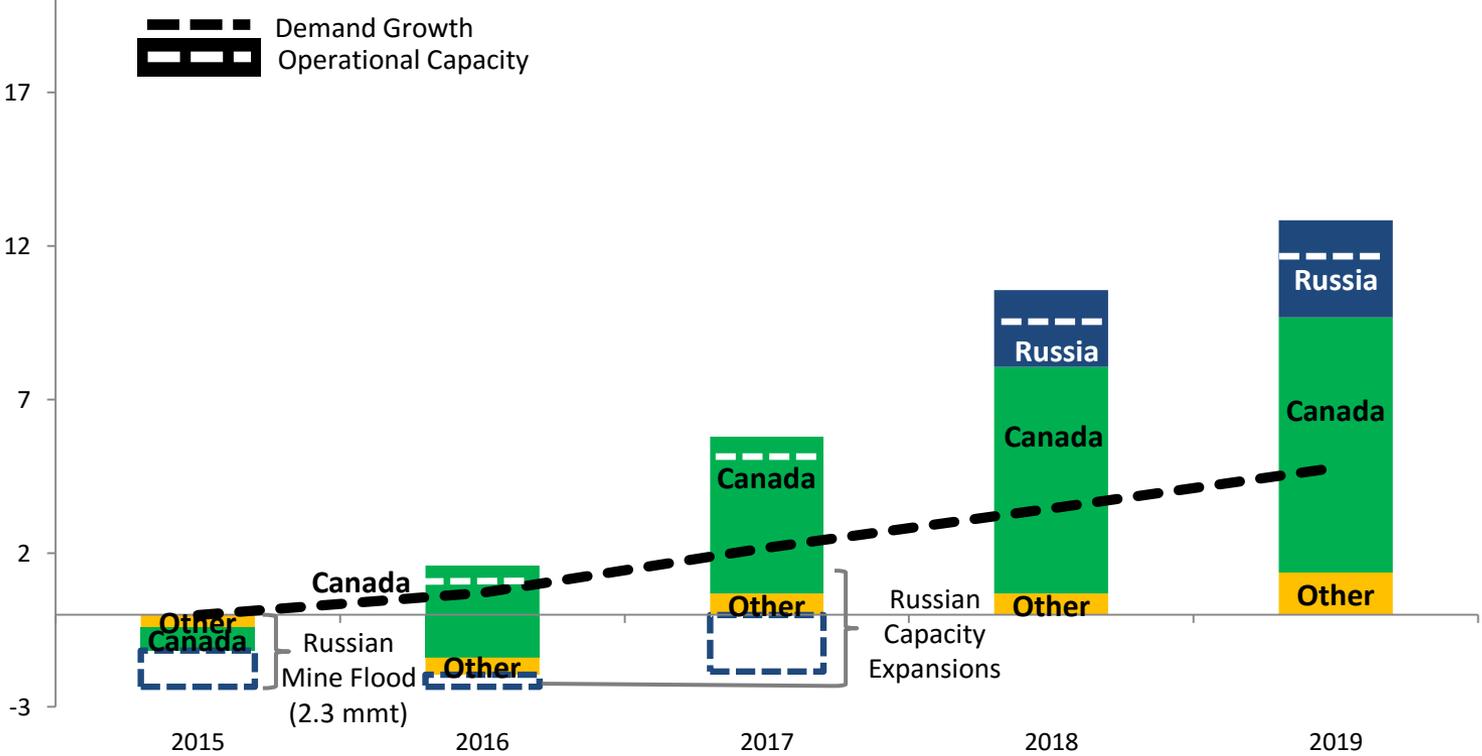
- Higher capacity additions than demand growth drive lower capacity utilization in 2016, but by 2018 demand growth exceeds supply growth
- **Chinese capacity utilization was higher than global average in 2014/2015**, but expected to decline to global equivalent levels in 2016-forward
- Urea capacity utilization dips lower than overall N due to urea upgrade projects

Global Nitrogen Capacity Utilization (excl. China)



Global Potash Capacity & Demand Growth

Cumulative Global Capacity Additions & Demand Growth (mmt KCl)

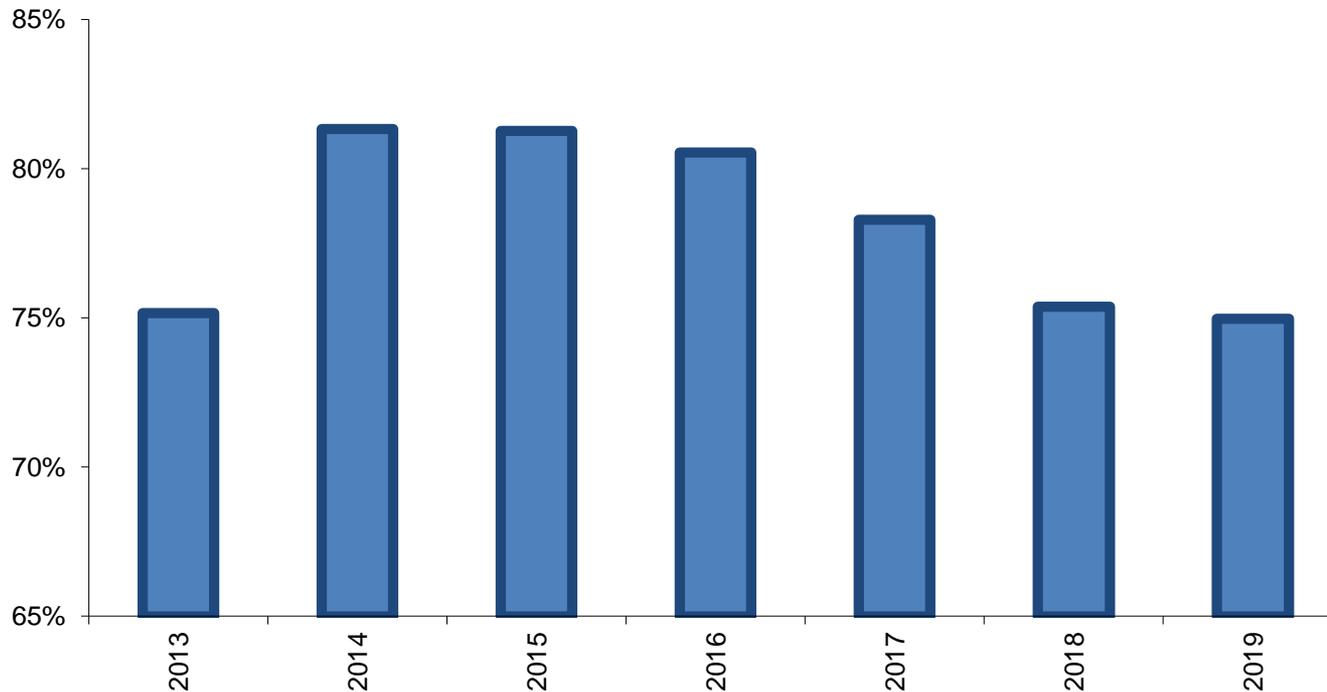


Source: Fertecon, Agrium, (Total KCl global capacity of ~ 74 mmt at 100% of capacity in 2015, 67 mmt of operational capability in 2015.)

Potash Capacity Utilization

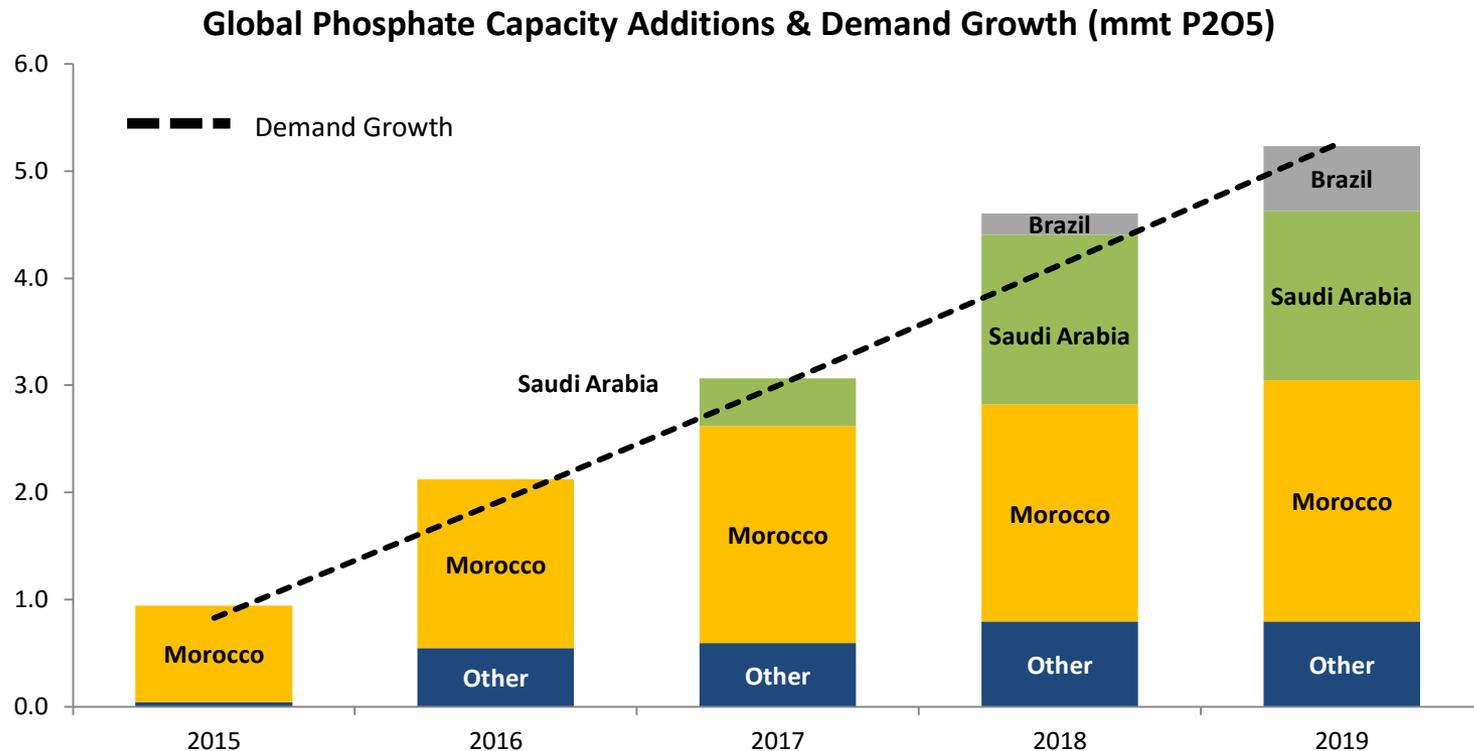
- The supply/demand outlook has improved since last year
 - Stronger than expected 2014 and 2015 demand and improved demand outlook
 - Flooding of Uralkali mine reduced supply
- Capacity utilization now projected to bottom out in 2018/2019 at similar levels to 2013

Global Potash Capacity Utilization Rates



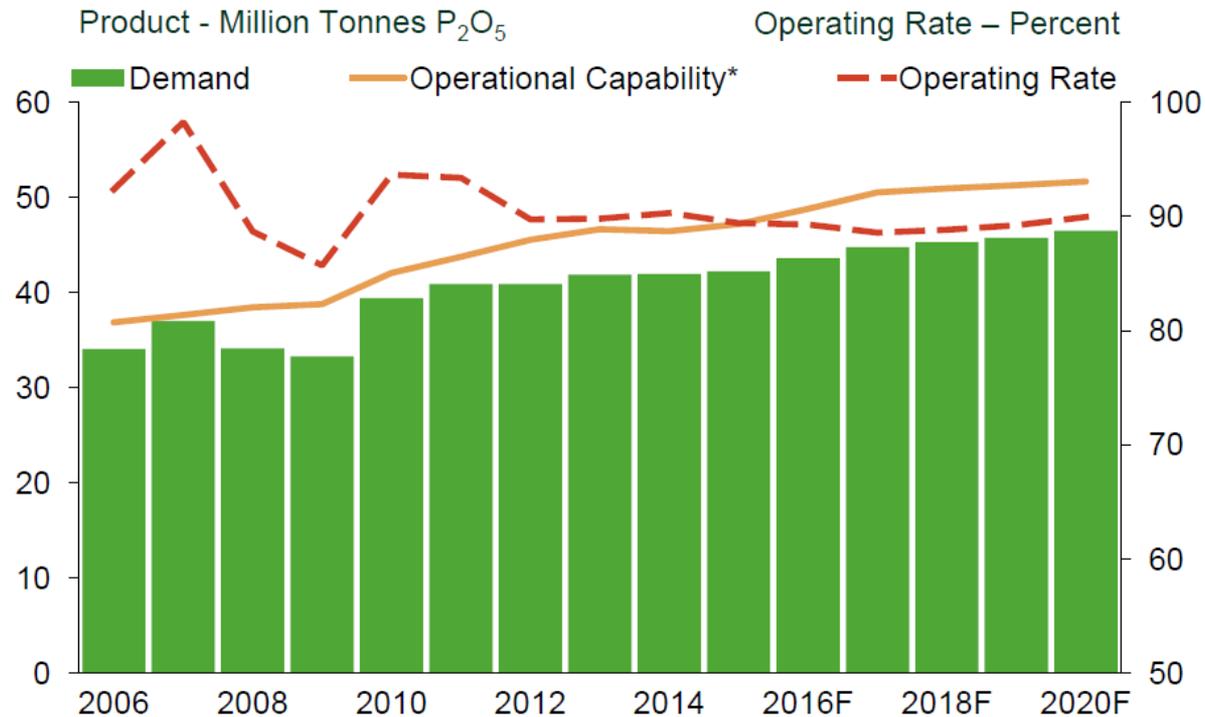
Global Phosphate Capacity & Demand Growth

- Ma'aden project in Saudi Arabia has experienced delays in the past year
- China has balanced the market over the past year, but some expect capacity in China to decline over the medium term
- Indian demand has been robust in 2015, but weakened rupee is a risk



World Phosphoric Acid Supply and Demand

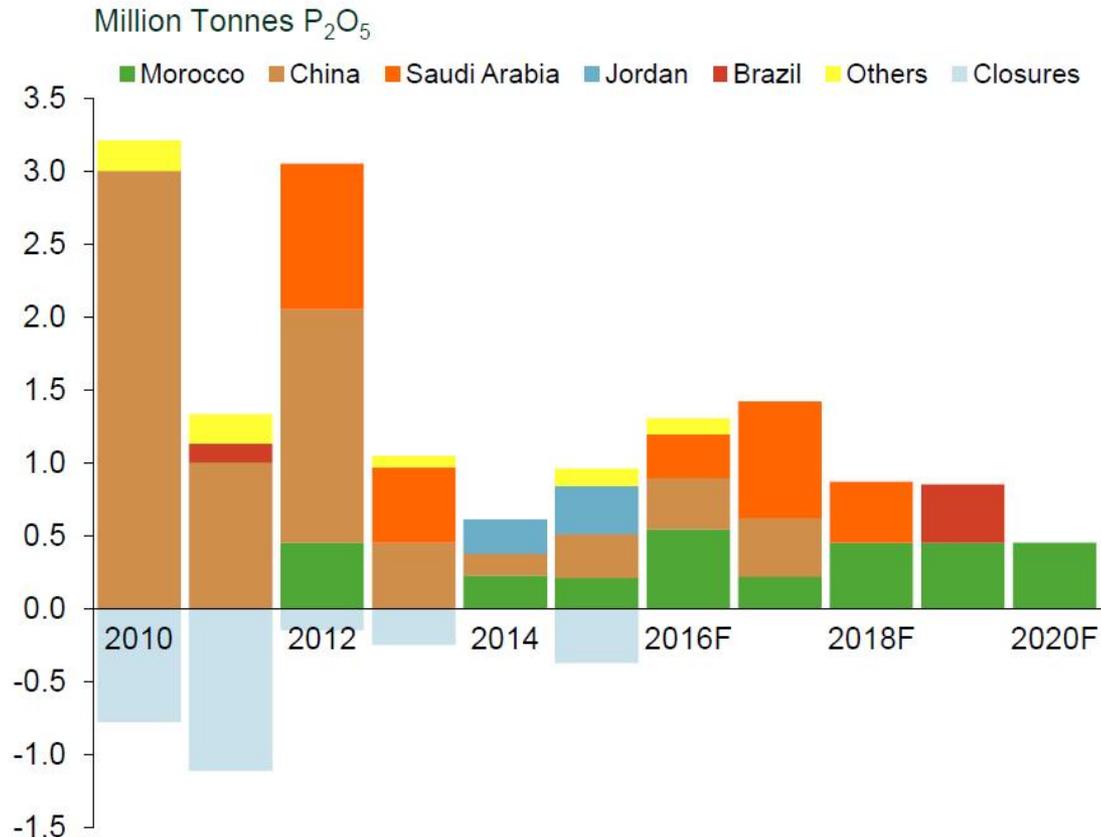
Expect Relatively Balanced Supply/Demand in the Medium Term



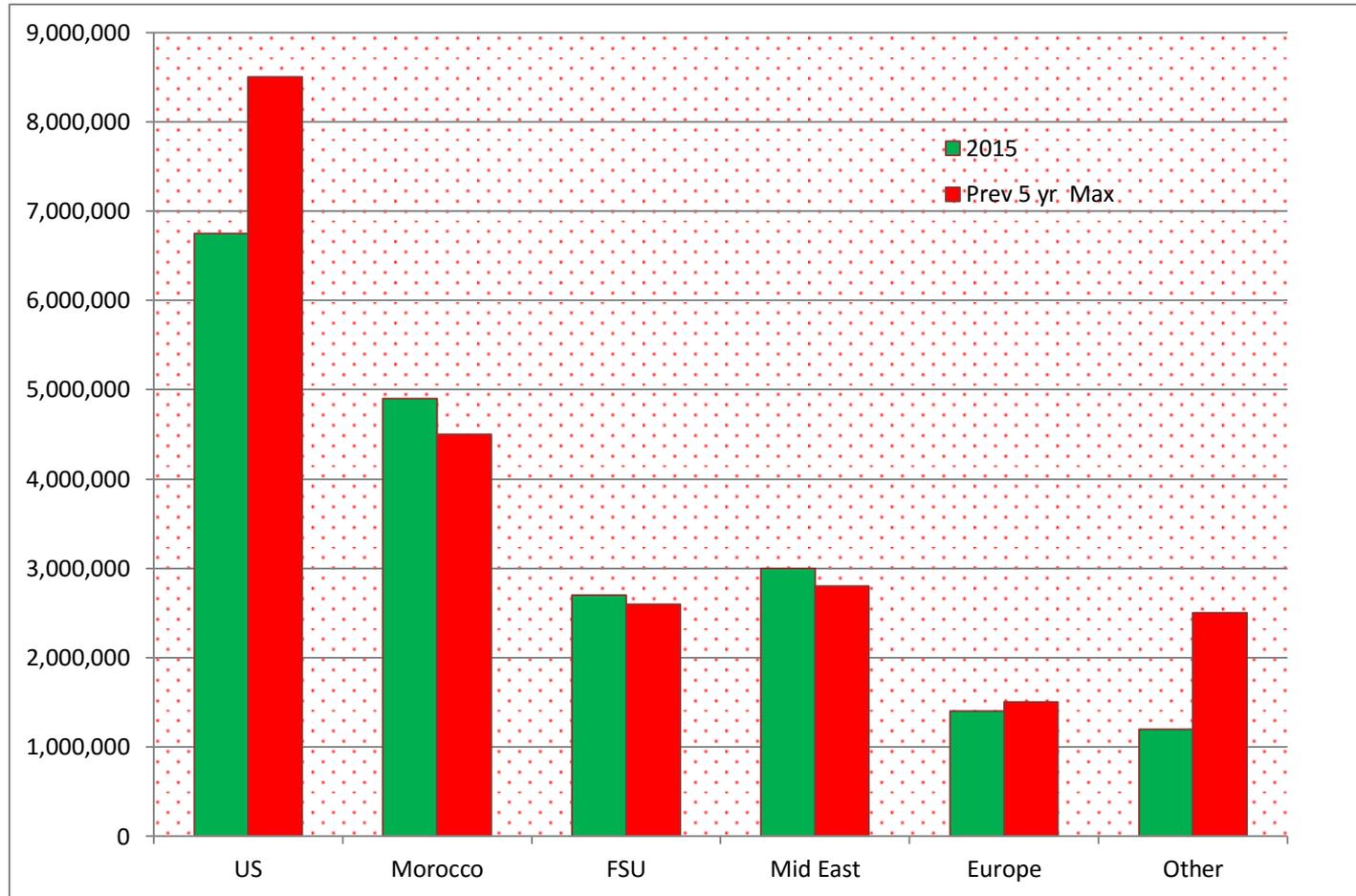
*Estimated annual achievable production level from existing operations and projected new capacity.

World Phosphoric Acid Capacity Additions

Majority of Expected Capacity Developed in Morocco, Saudi Arabia and South America



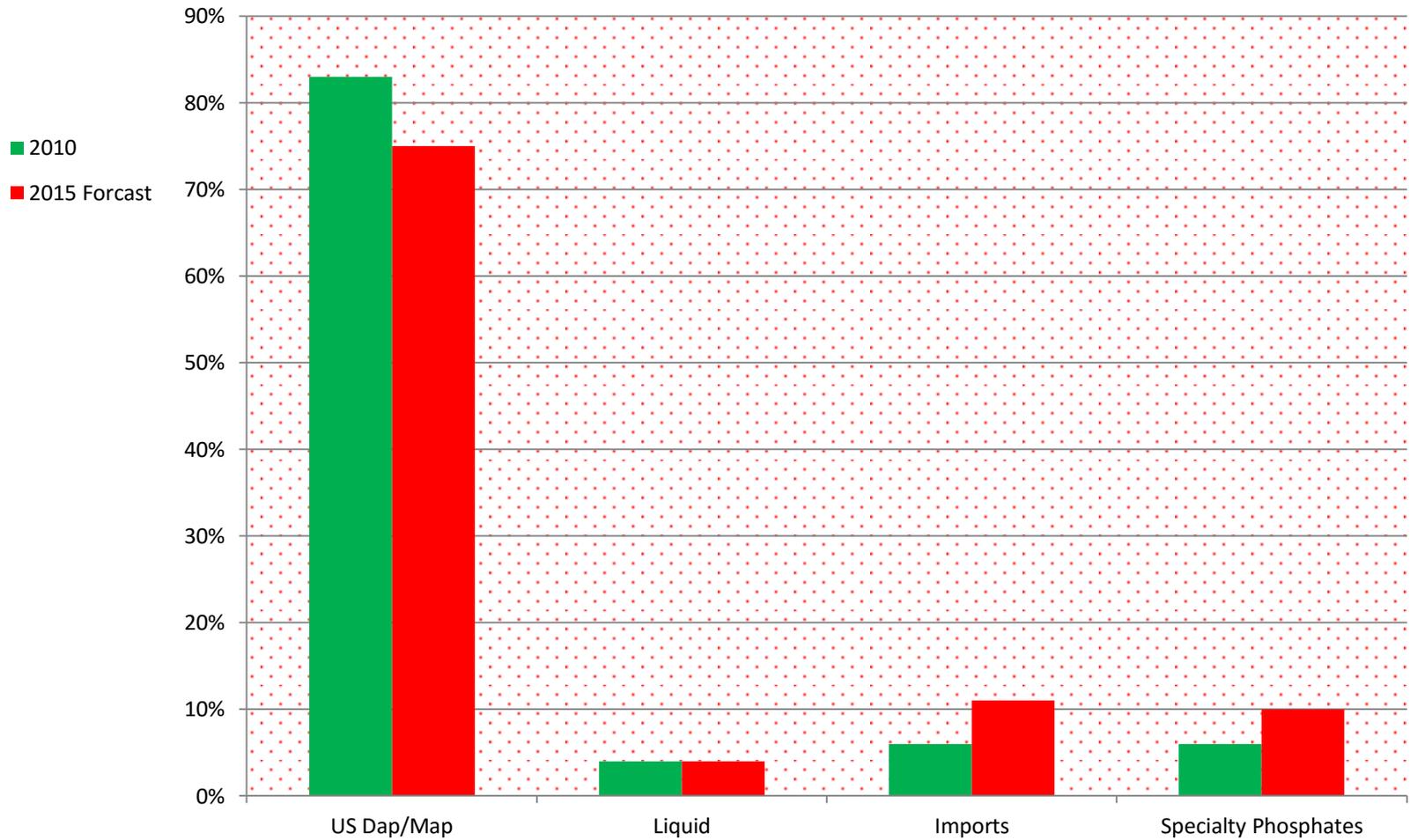
Phosphoric Acid Production



Excludes China

Plant problems/closures are balancing market

US Phosphate Usage



- **Nitrogen**-is fairly in balance with projected growth and projected demand
- **Phosphates**-have transitions, but are coming in line with projected demand
- **Potash**-production will exceed demand after “fixes” and upgrades into 2019. Expected to improve after that.

With supply and demand in balance what will drive pricing?
Where are there challenges/opportunities?

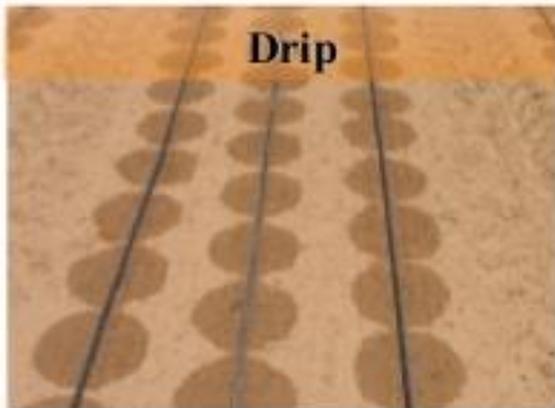


NO
BOATS



NO

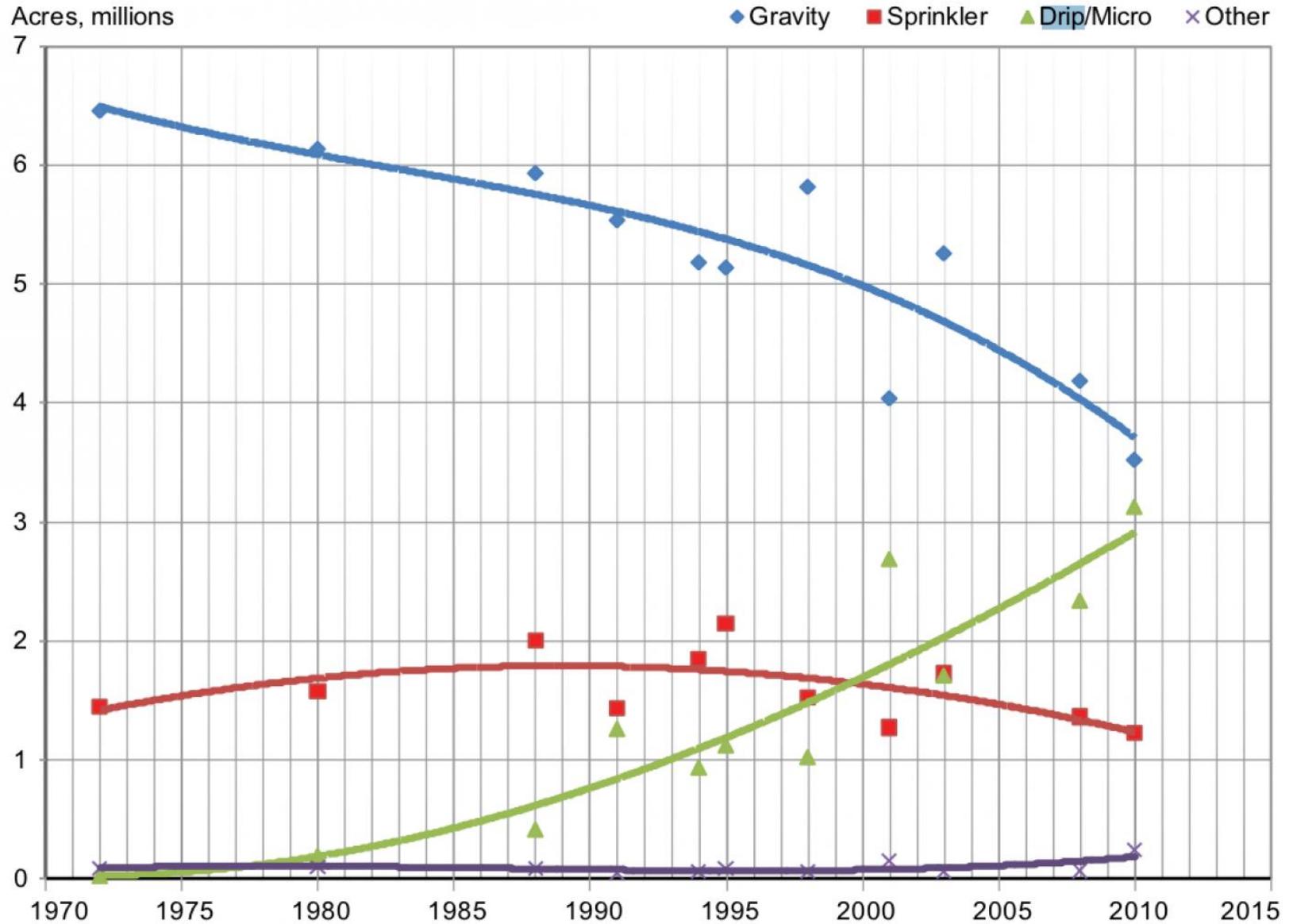
Field crops- different methods irrigation

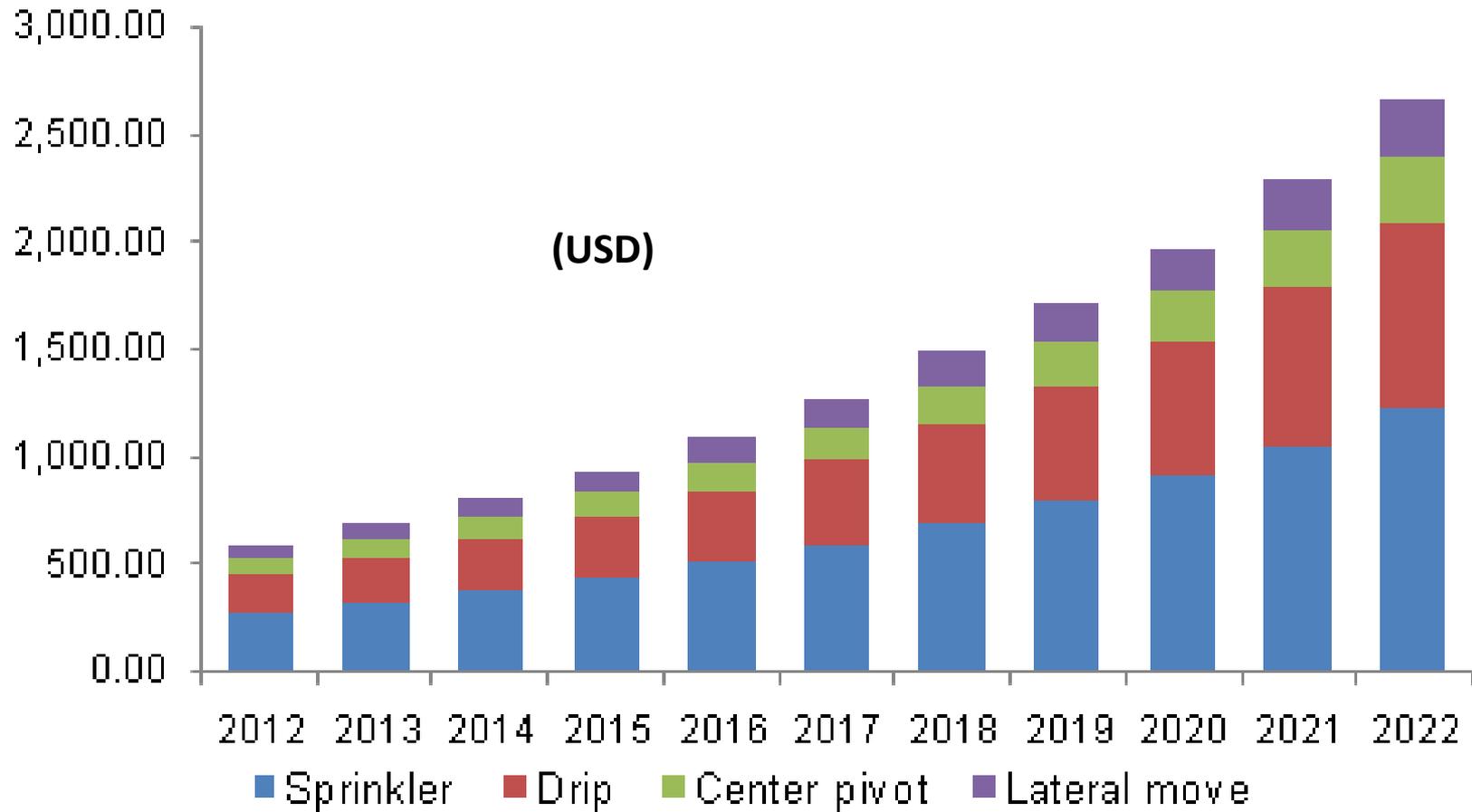


DRIP IRRIGATION

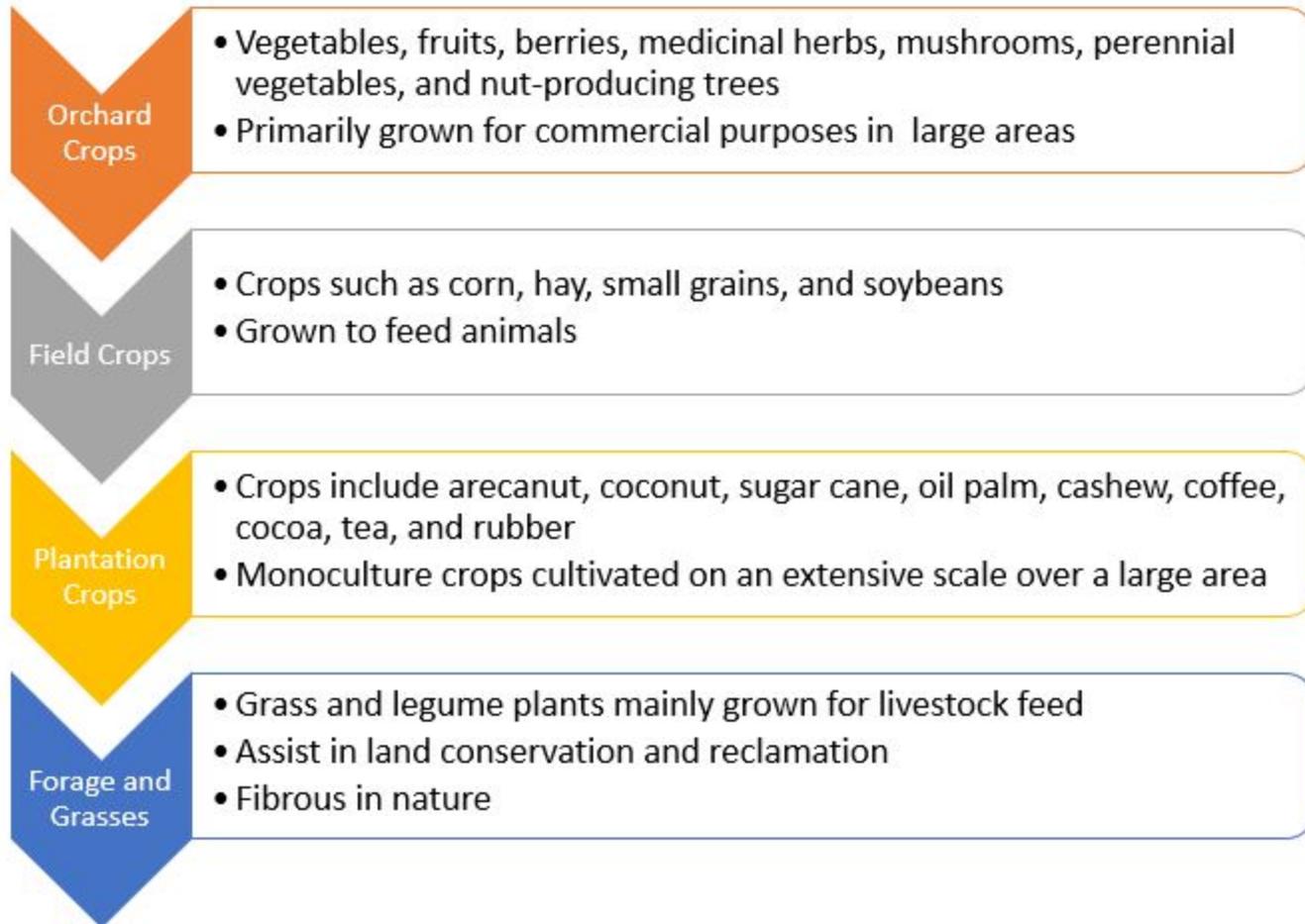
- In Drip Irrigation, the plant foliage remains dry . This prevents the diseases and leaf burns that are some times evident in sprinkler Irrigation.
- In Drip Irrigation, the area between wetted strips is kept dry. This facilitates the movement of machinery and farm implements when irrigation is in progress.
- Drip Irrigation is well suited to all soils and also for heavy soils with low infiltration rate or soils that form surface crusts when sprinkled.
- Drip Irrigation requires no special land preparation.

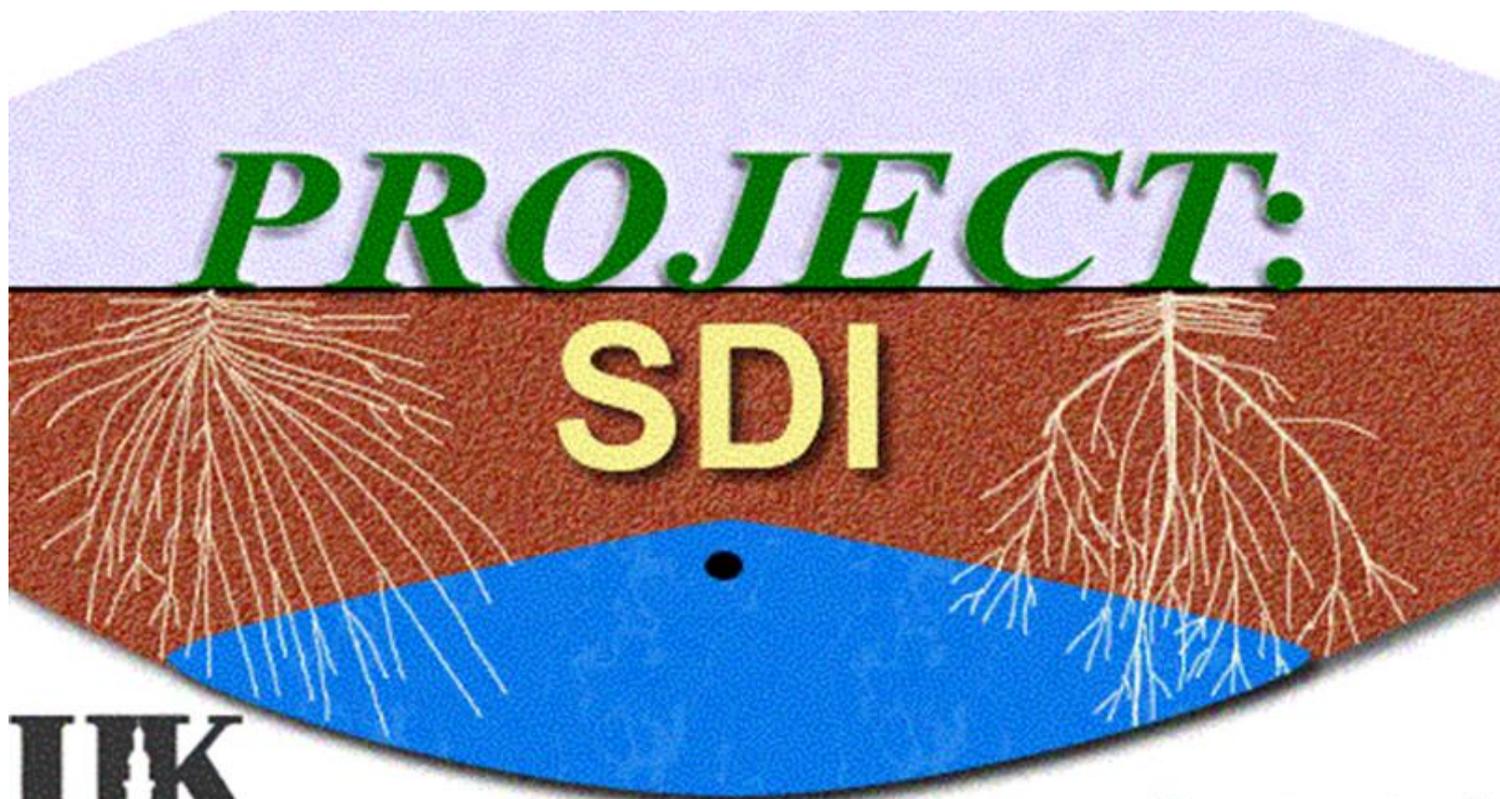
Figure 2-3 Change in Irrigation Methods in California (1977-2010)





Crops using micro irrigation





UK

UNIVERSITY OF KENTUCKY
College of Agriculture

Departments of:

Agronomy and Biosystems
& Agricultural Engineering

From This



To this!



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Corn Growers Convert to Subsurface Drip Irrigation

Netafim USA
Subscribe 477

12,142

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Published on Feb 13, 2014
Learn more here: <http://bit.ly/1w4oVCR>

Listen to growers who've converted from center pivot and furrow irrigation systems to a Netafim SDI system, discuss the benefits they're now

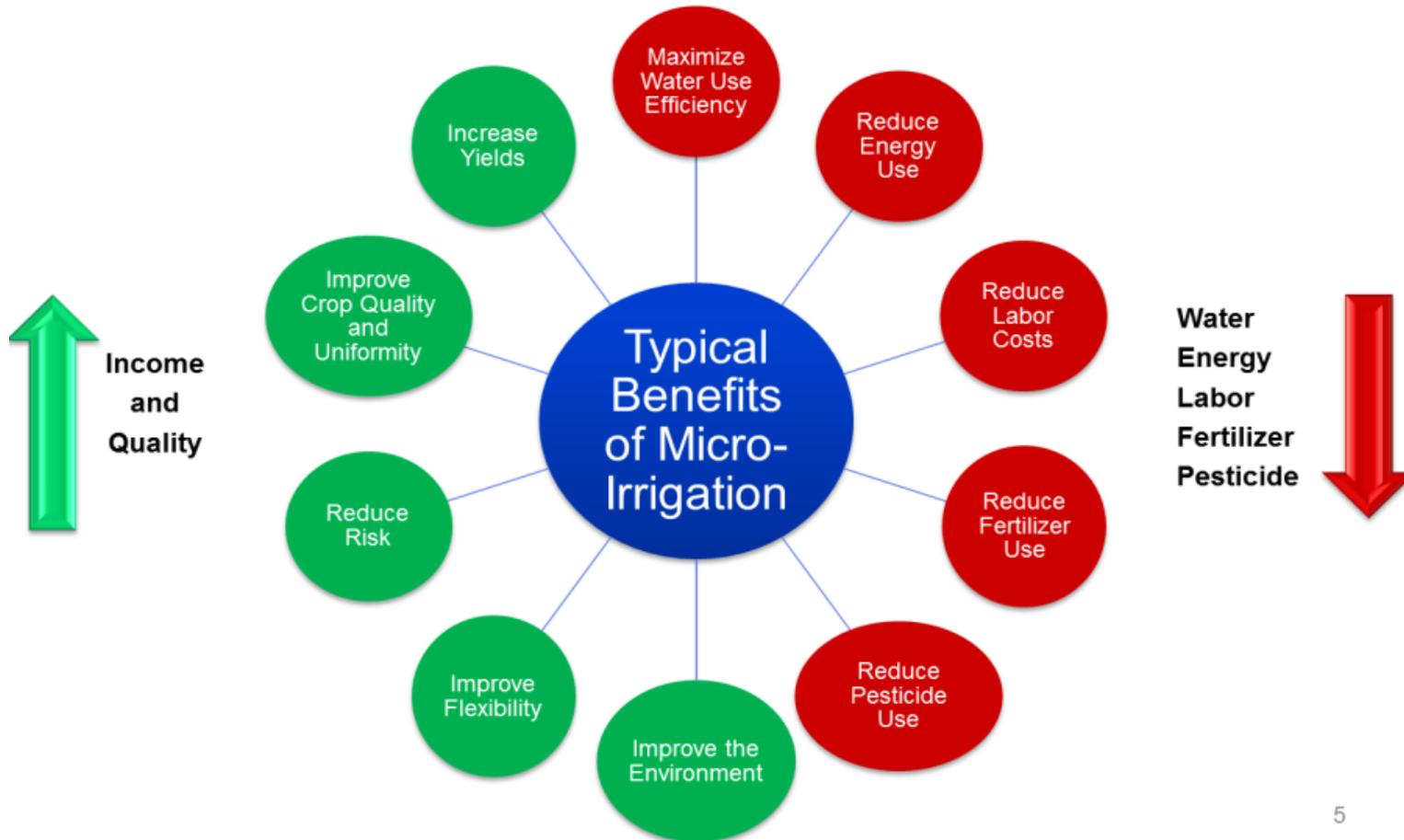
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This is NOT just about water!



Commodity Crops (Corn, Alfalfa, Cotton) are still in the infancy of development.

- The cost of Sub-Surface Drip Systems and ROI are barriers to growth in these markets.
- Having said that...Cotton in West Texas is a well penetrated market.

“So what?”

Perfect marriage

- Ability to immediately respond to a crops water and nutrient needs is extremely valuable.
- Gives opportunity to match crop nutrient uptake curves.
- Helps avoid losses of water and nutrients beyond the root zone.

DRIP IRRIGATION BENEFITS BY GROWTH STAGE

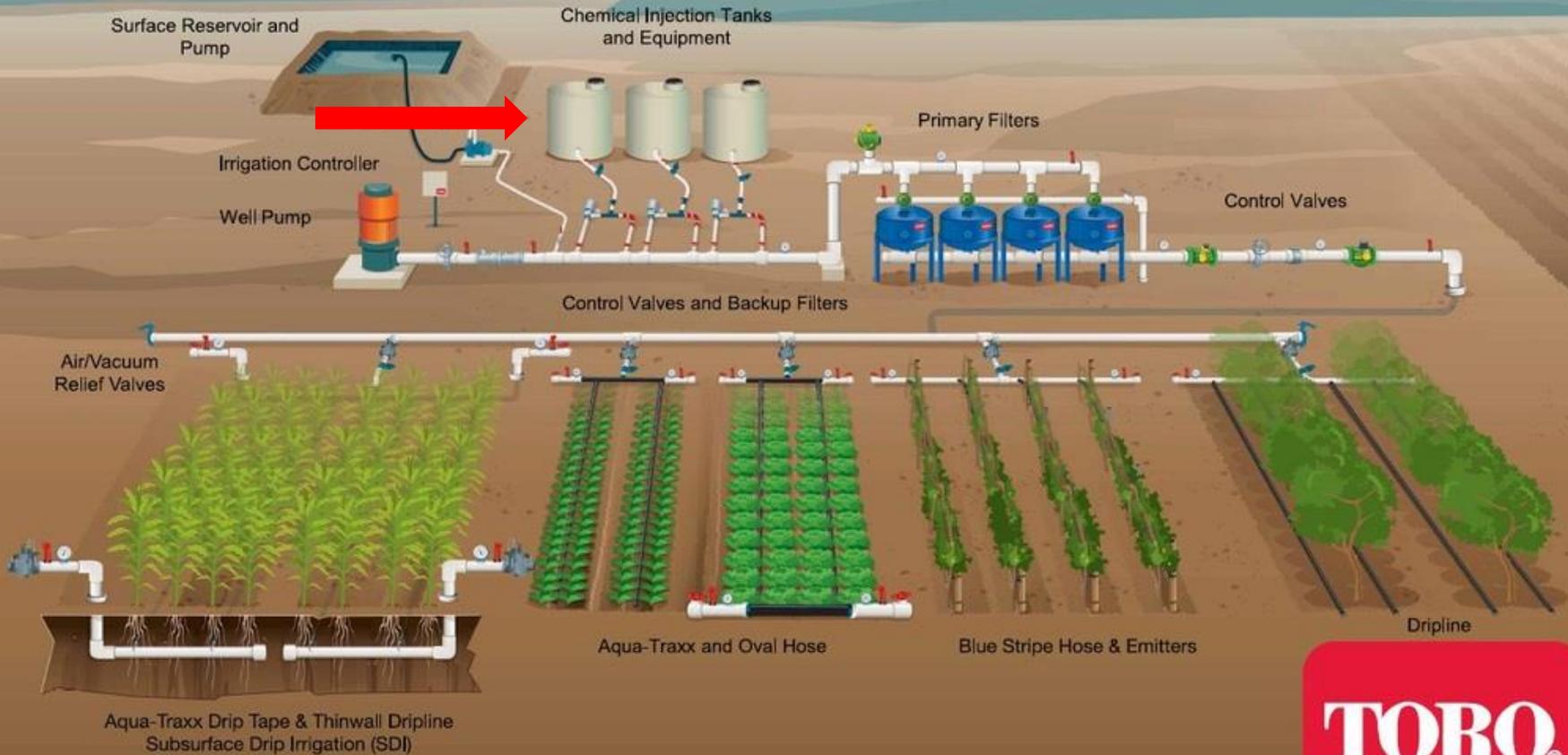


VEGETATIVE STAGES **REPRODUCTIVE STAGES**

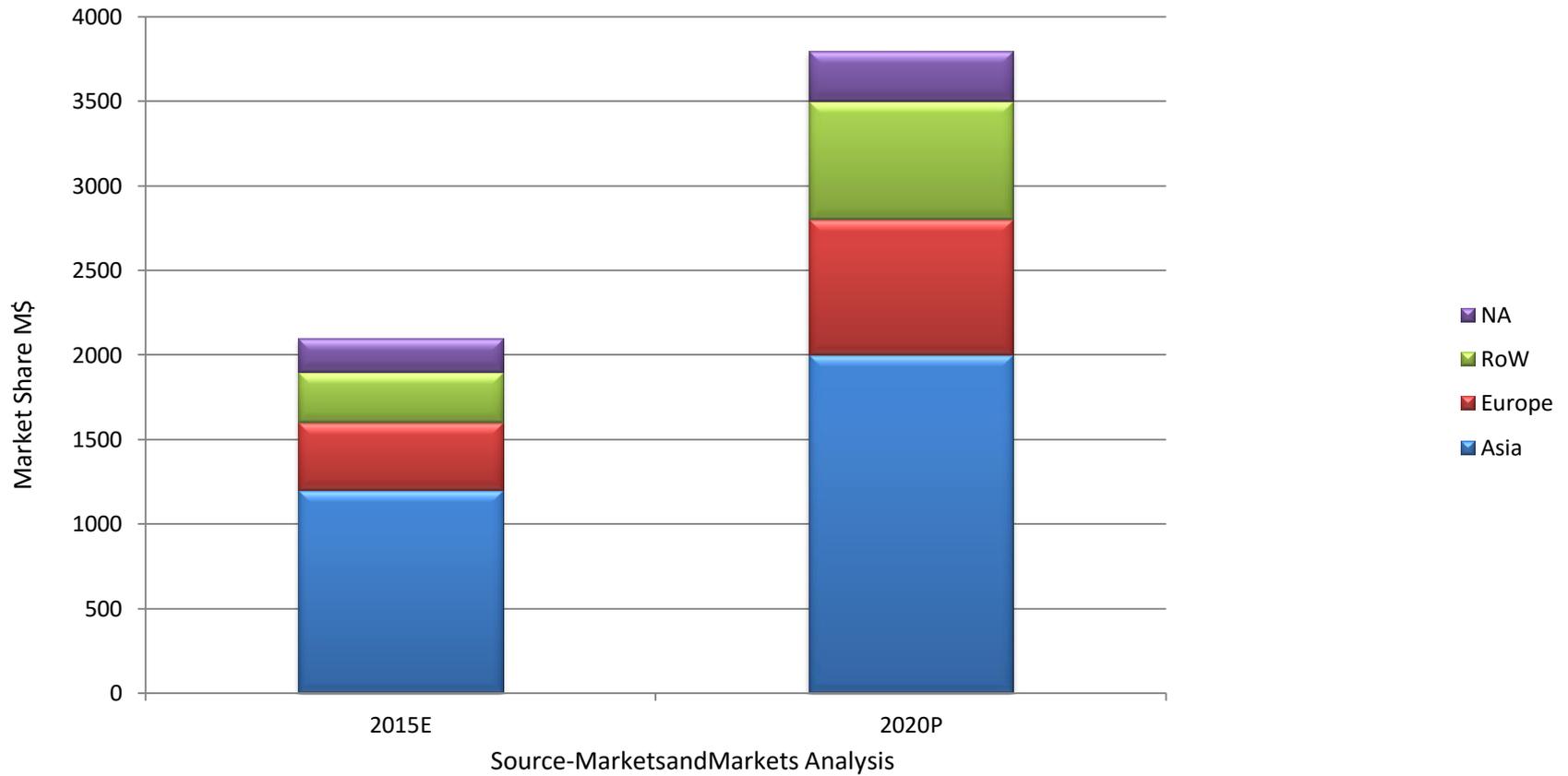
<p>VE Germination and Emergence</p>	<p>V1-V5 Early Vegetative Stages</p>	<p>V6-V14 Rapid Vegetative Growth</p>	<p>VT Critical Flowering Stage and Tasseling</p>	<p>R1-R6 Grain Fill and Harvest</p>
<p>Rapid, uniform germination and emergence</p>	<p>Precision application of nutrients promotes rapid root development.</p>	<p>Optimizing water supply and nutrient availability to plants during peak N, P and K uptake period.</p>	<p>Supply peak water needs during most yield critical period to maximize crop potential.</p>	<p>The ability to apply late season nutrient requirements directly to the root zone.</p>

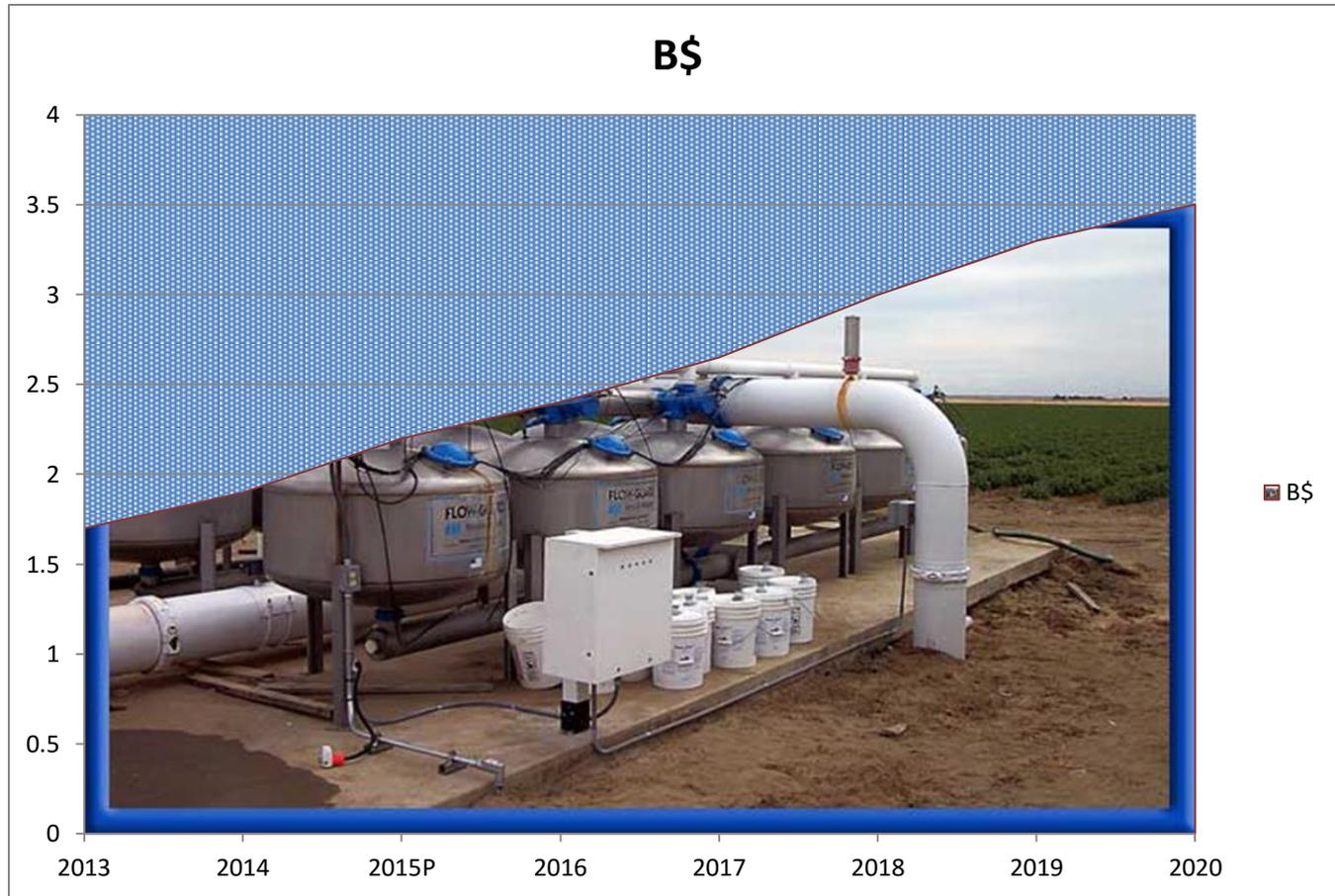


Typical Drip System Layout



Projected growth of Drip (world)

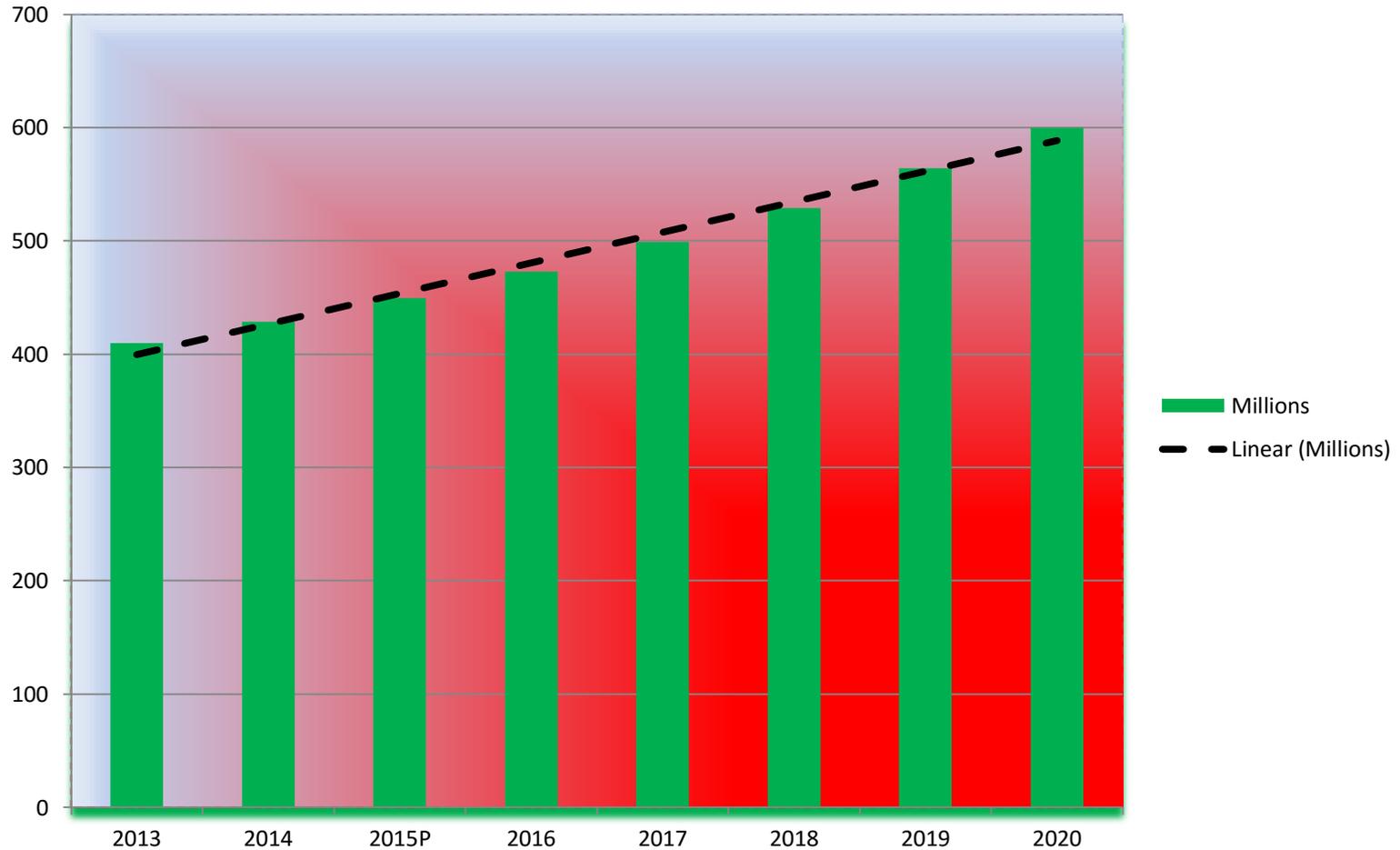




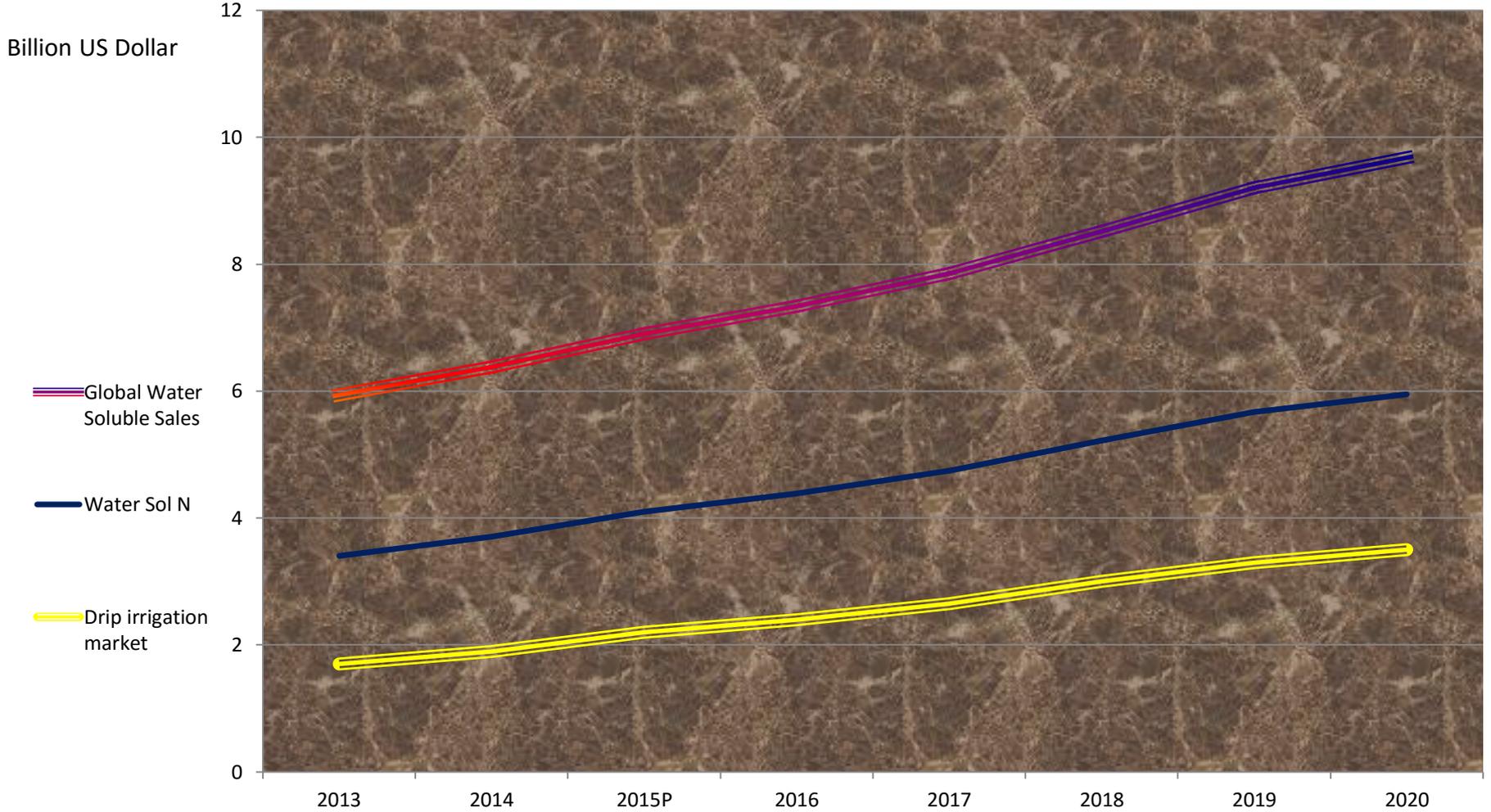
MarketsandMarkets

North America Water Soluble Projected Growth

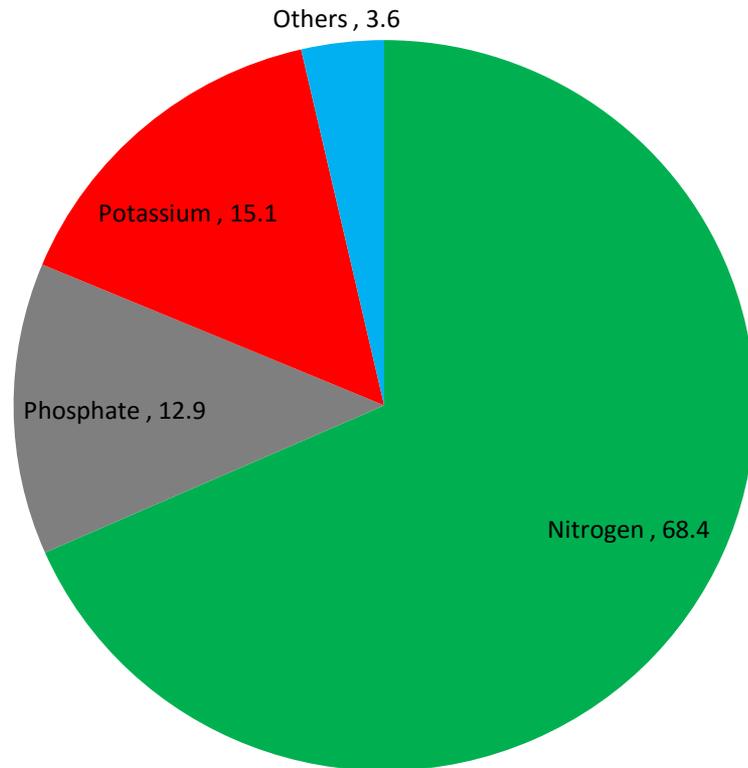
Million Dollars



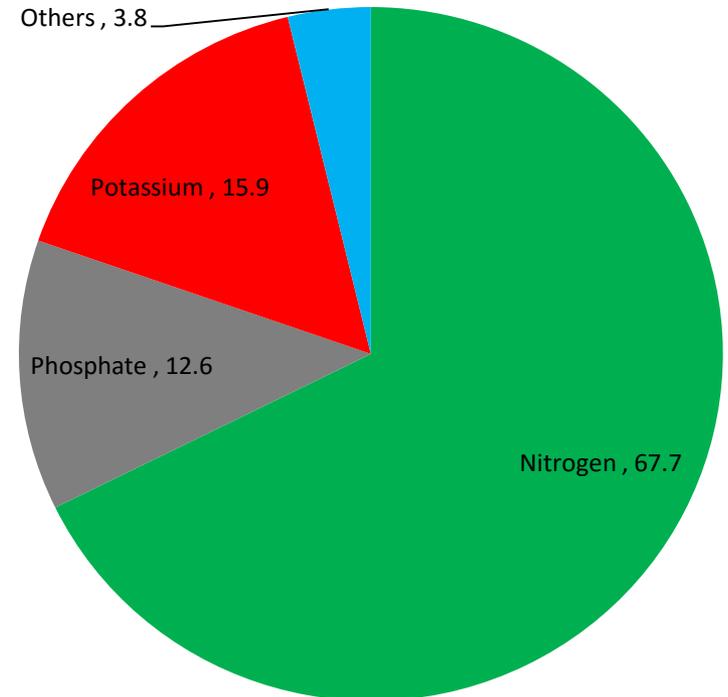
As the efficiencies of the technology improve.....



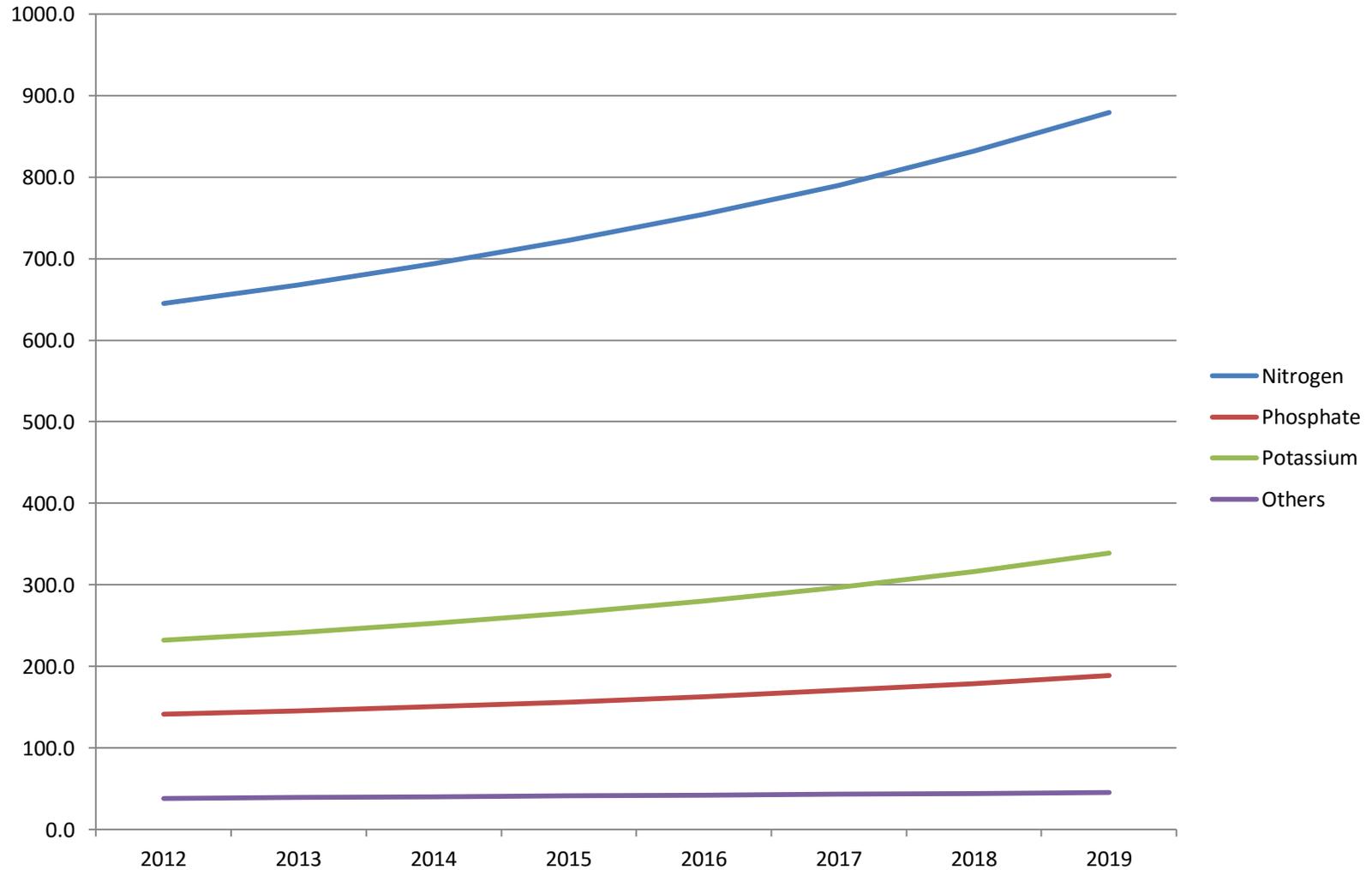
2012



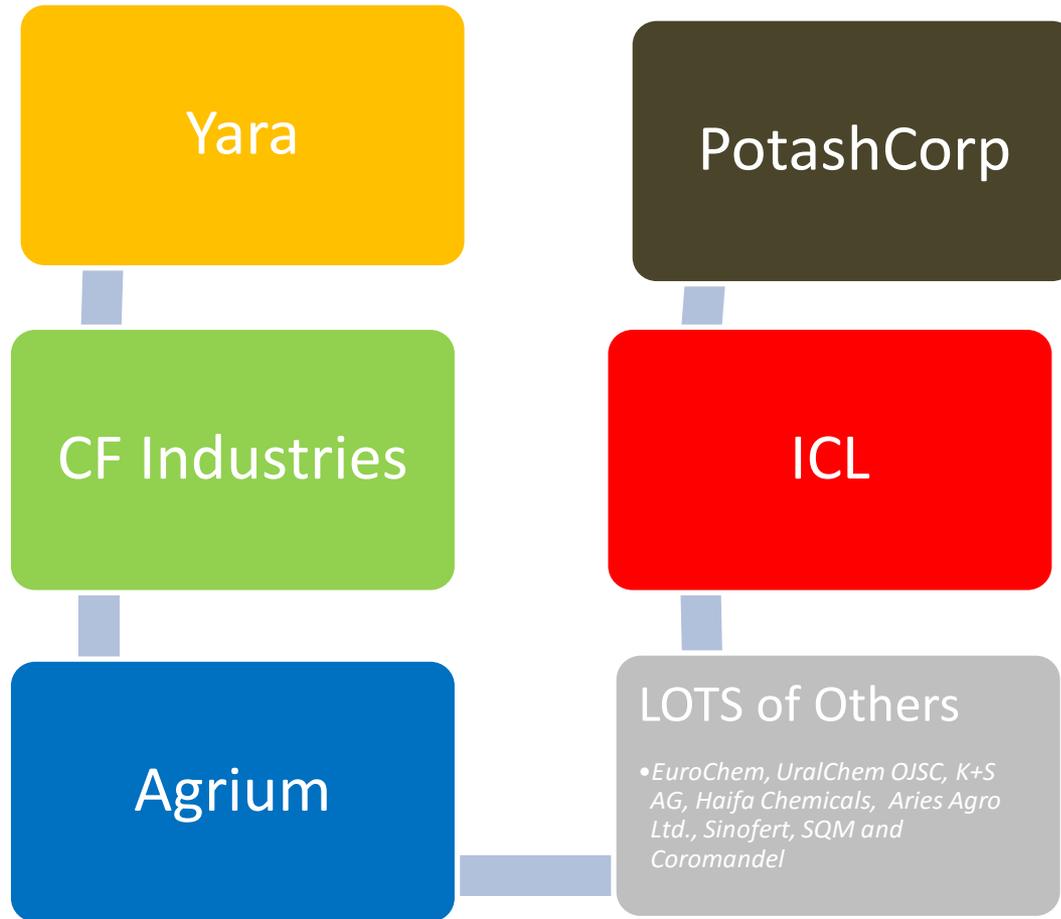
2019 P



Projected NA growth by nutrient



Some of the Major Players?



Up significantly in the next several years US too!

25%-30% is used as a Foliar application

70%-75% is used in Fertigation

Nitrogen is most popular and will show substantial growth

Potassium is very attractive, and will grow at a little faster rate

Phosphate is the least attractive due to low solubility/acidity issues

Secondary and Micro nutrients will be big sellers

Water and soil conditioners will have opportunities as well

Critical Success Factors in Latin America

Relevant factors when buying fertilizer (Multiple Choice %)

