Fertilizer's Future: Nutrient Stewardship

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Nitrogen
Phosphorus
Potassium

TFI: The Voice of the Fertilizer Industry

- **Core Purpose**

"We represent, promote and advance the plant nutrition industry"

- **Vision**

"We are committed to safe, secure, and sustainable production, distribution, and use of plant nutrition"

Strategic Plan

Adopted, Sept. 2019

ENVIRONMENT

Goal

TFI defines, evaluates and promotes sustainable plant nutrition leading to a reduced environmental footprint for plant nutrient production and use.

INDUSTRY COMMITMENT

Goal

TFI members are committed to TFI's strategic vision.

POLICY AND REGULATION

Goal

Develop and promote legislative and regulatory outcomes that support the plant nutrition industry.

Economic Impact

National Impact

Wisconsin Impact

$2.17 billion Economic Impact for Wisconsin

This includes the direct contribution, supplier contribution and downstream positive impact of the fertilizer industry on the state economy.

Grand Totals for Wisconsin

The fertilizer industry is an important part of the economy in Wisconsin.

JOBS

9,190 Jobs

WAGES

$590.37 million Wages

Current Market Conditions

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What Drives the Fertilizer Market?

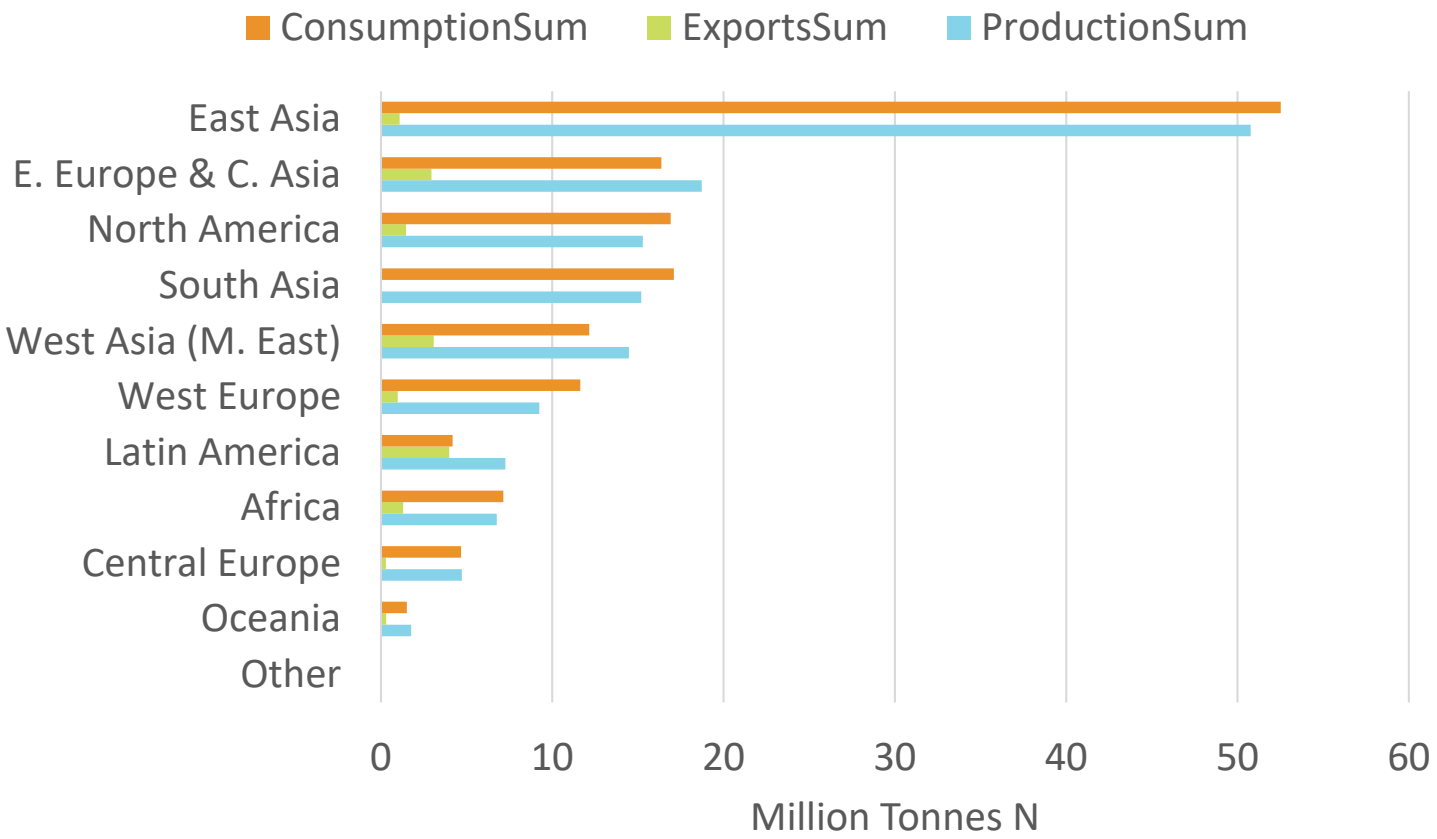
Demand

- Fertilizer Prices
- Expected “Crop” Prices
- Farm Income
- Weather
- Taxes
- Regulations
- Interest Rates
- Value of the U.S. $ (exports)
- Buyer Psychology
- Subsidies (international)
- Import Tariffs (international)

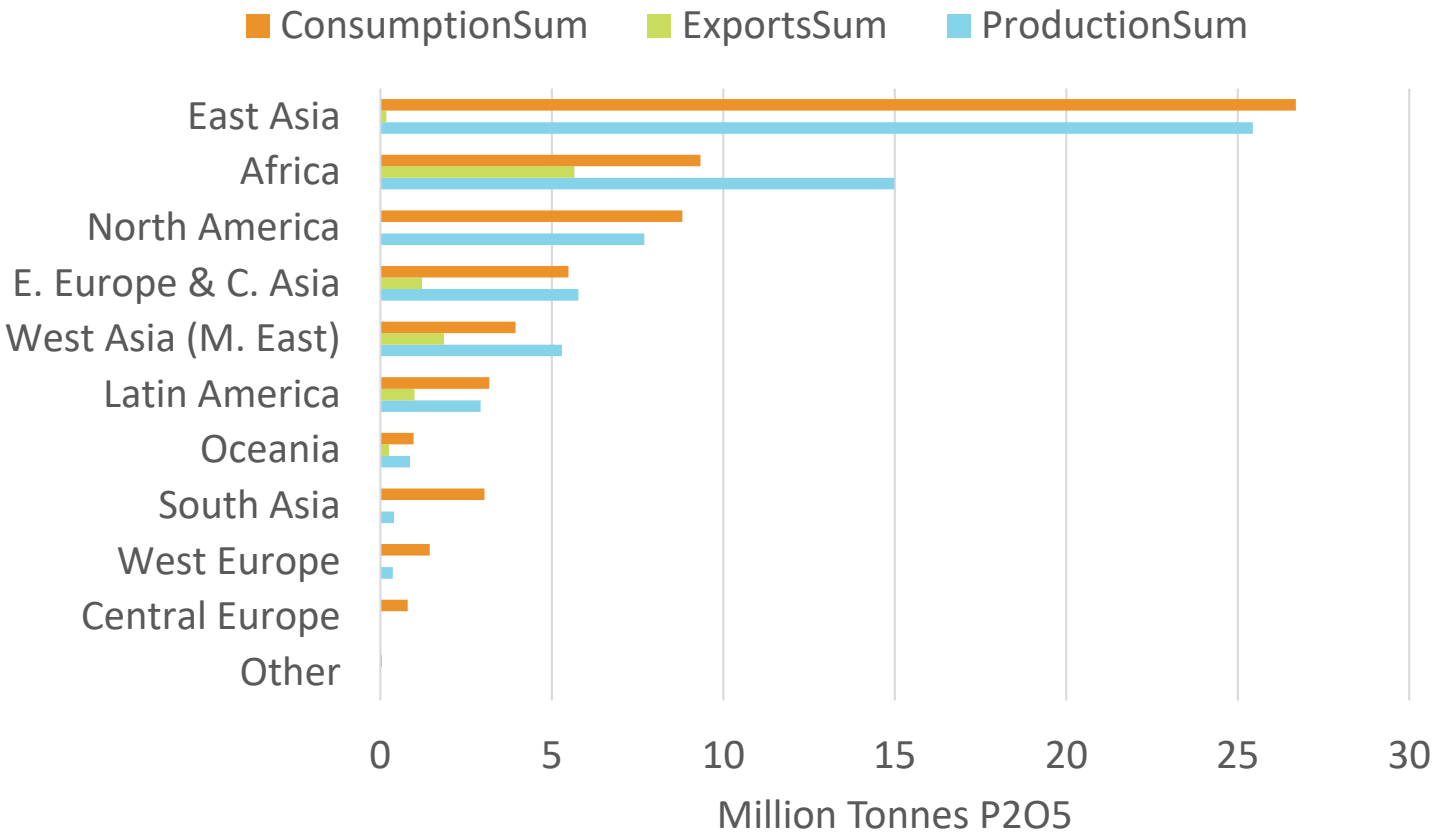
Supply

- Fertilizer Prices
- Input (Production) Costs
- Weather (Natural Disasters)
- Transportation Costs
- Value of the U.S. $ (imports)
- New Investment Costs:
  - Return on Investment (ROI)
  - Regulations (permits)
  - Interest Rates
- Subsidies (international)
- Export Tariffs/curbs

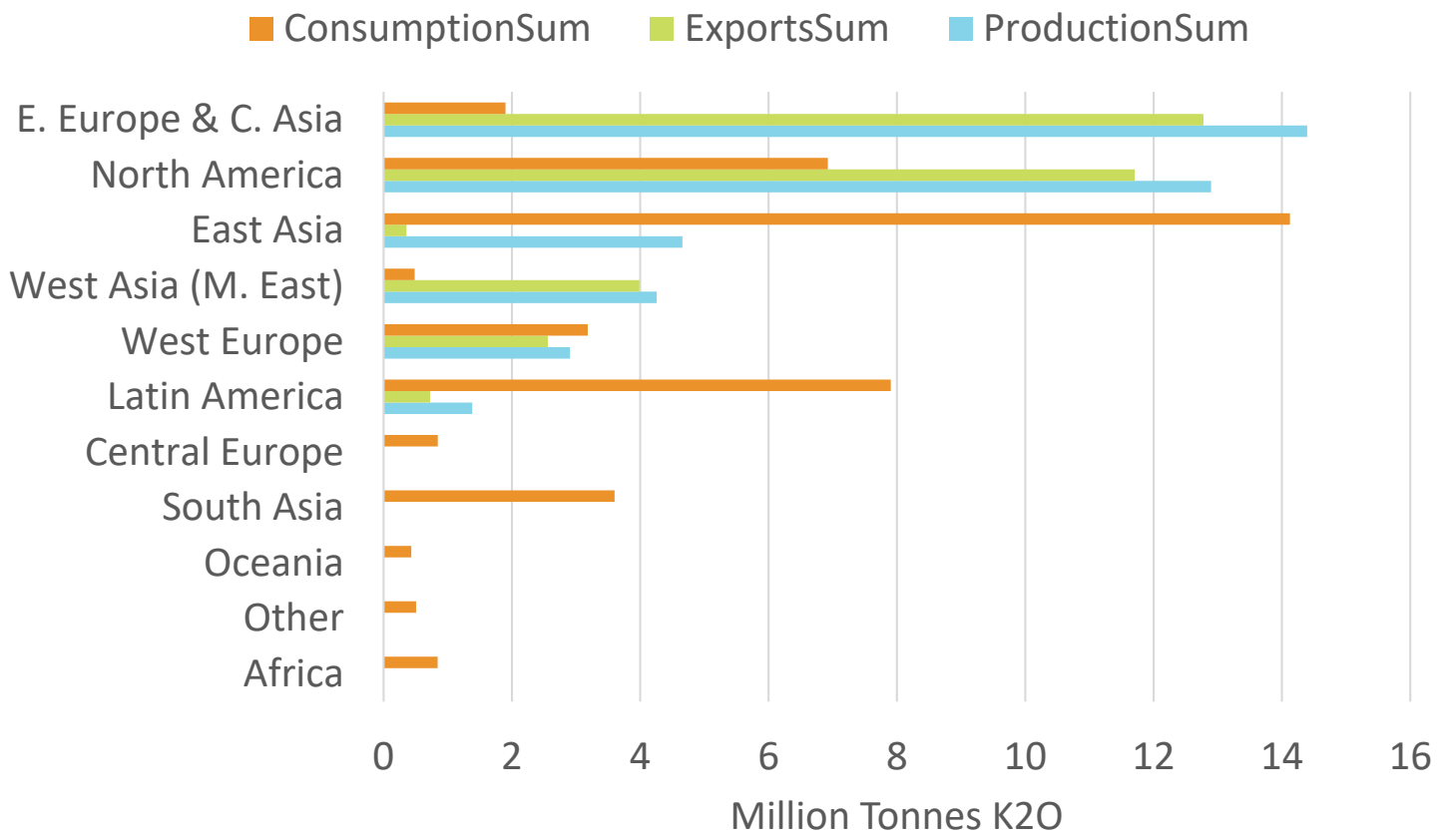
Ammonia Supply/Demand



Phosphate Rock Supply/Demand

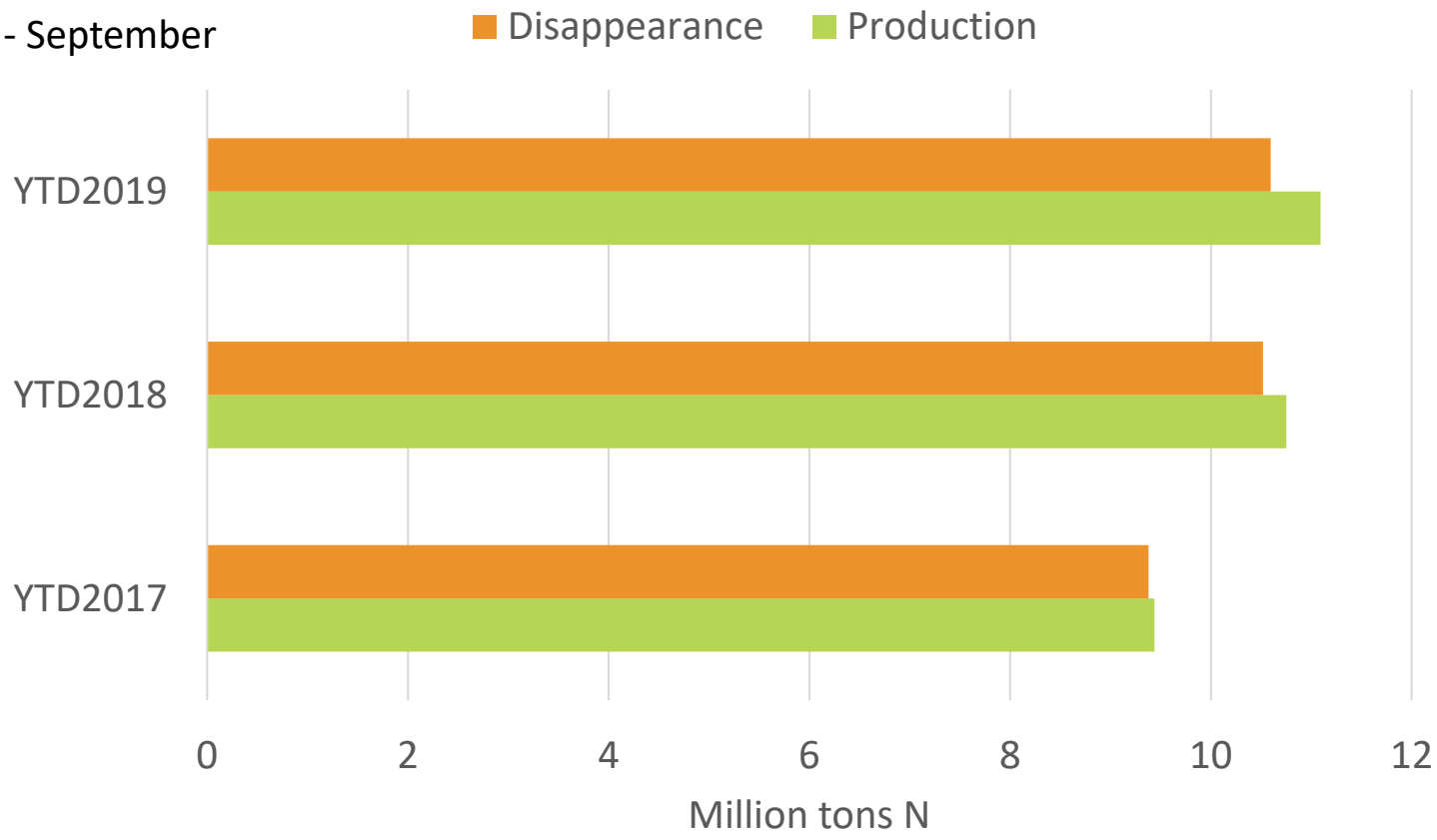


MOP Supply/Demand

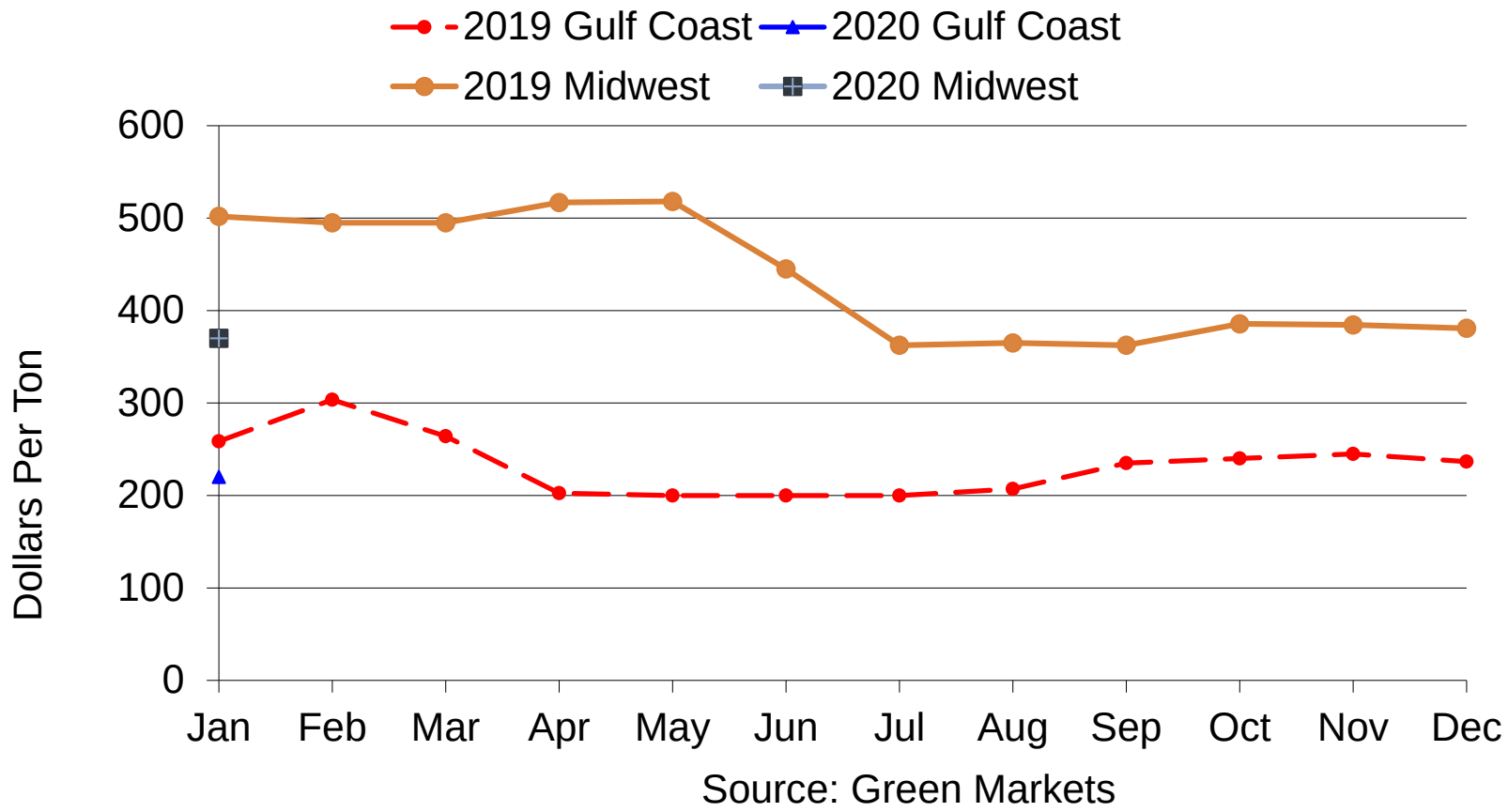


U.S. Nitrogen Production

January - September

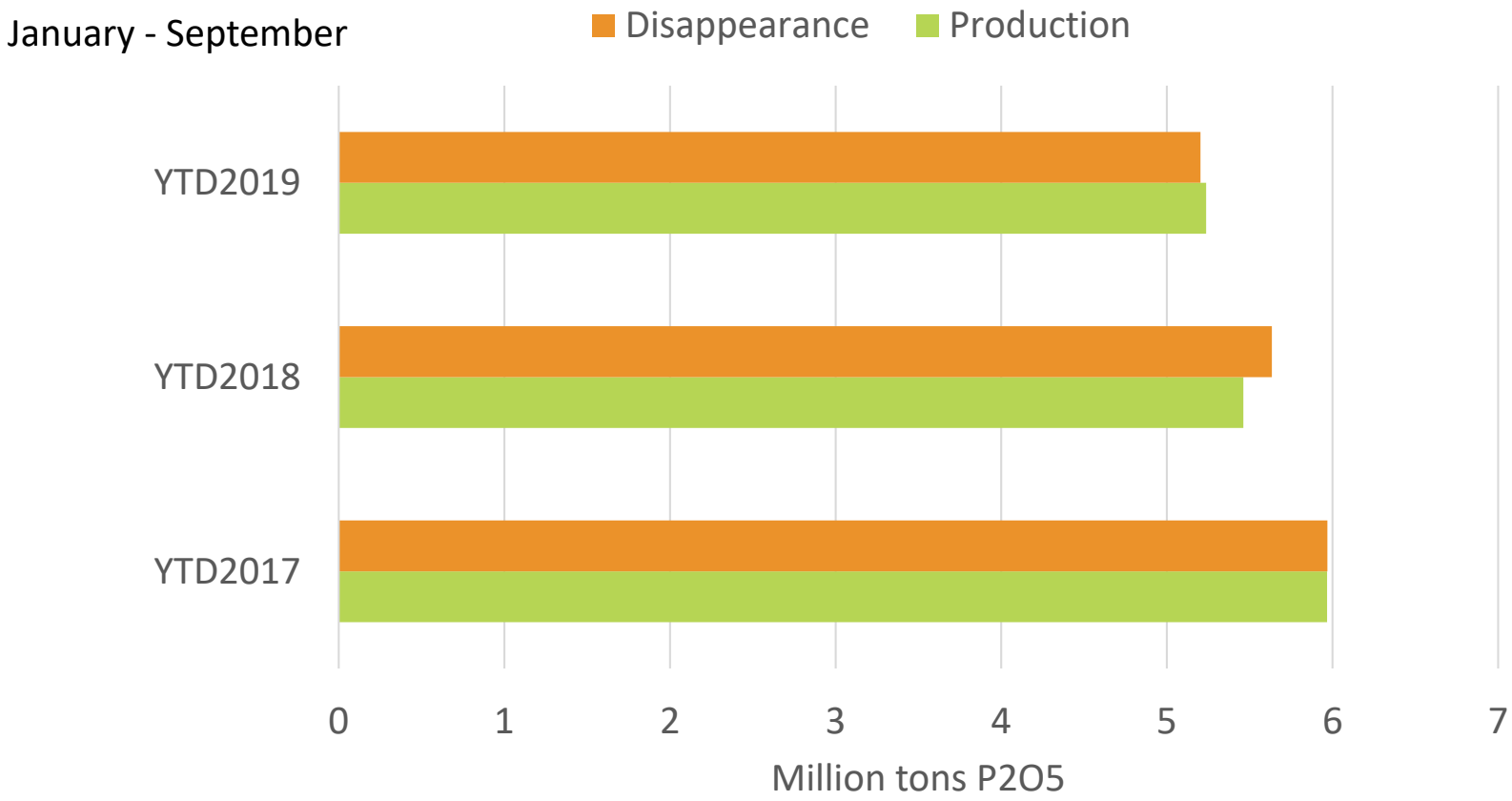


U.S. Ammonia Prices Gulf Coast & Midwest

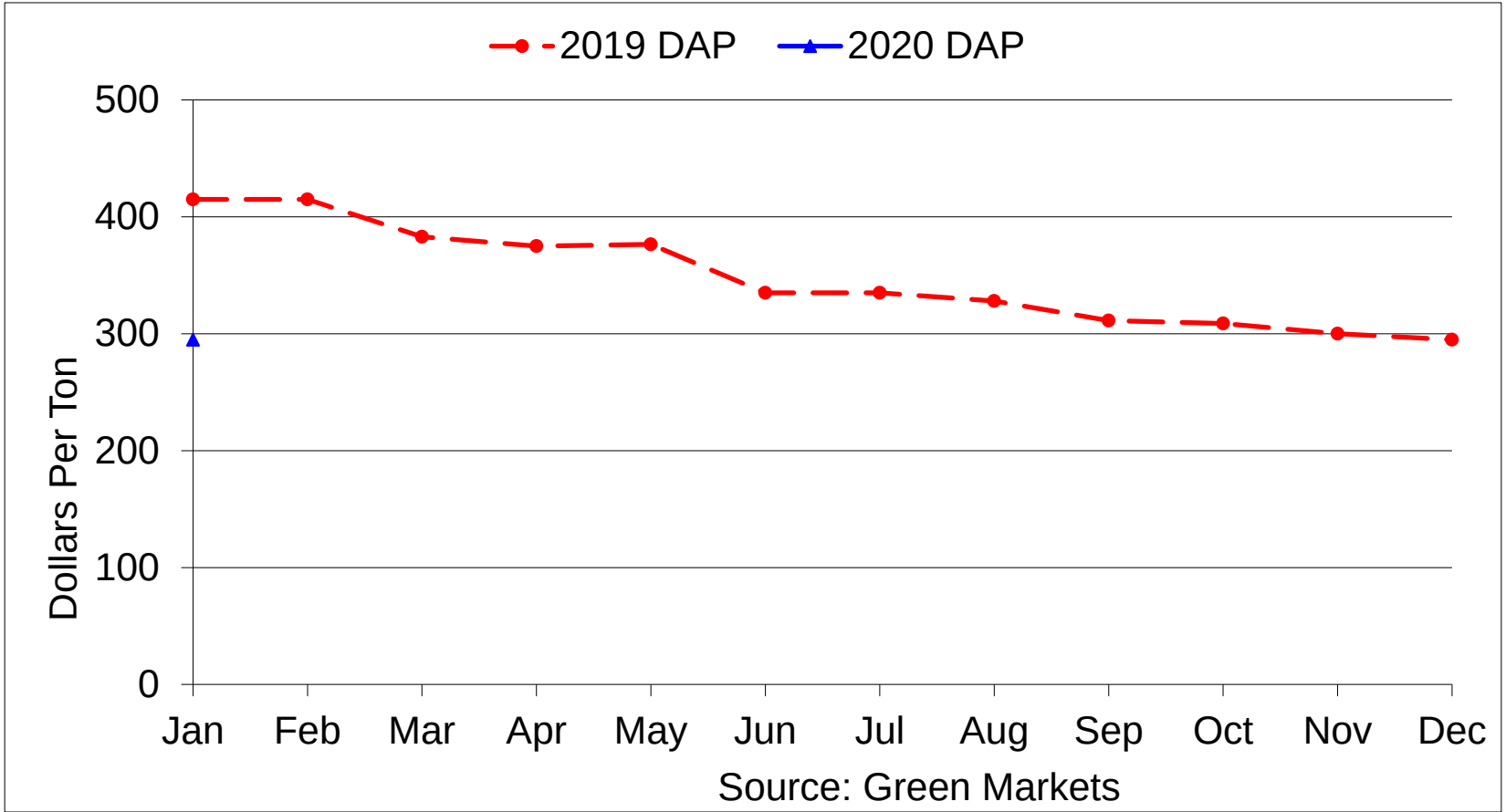


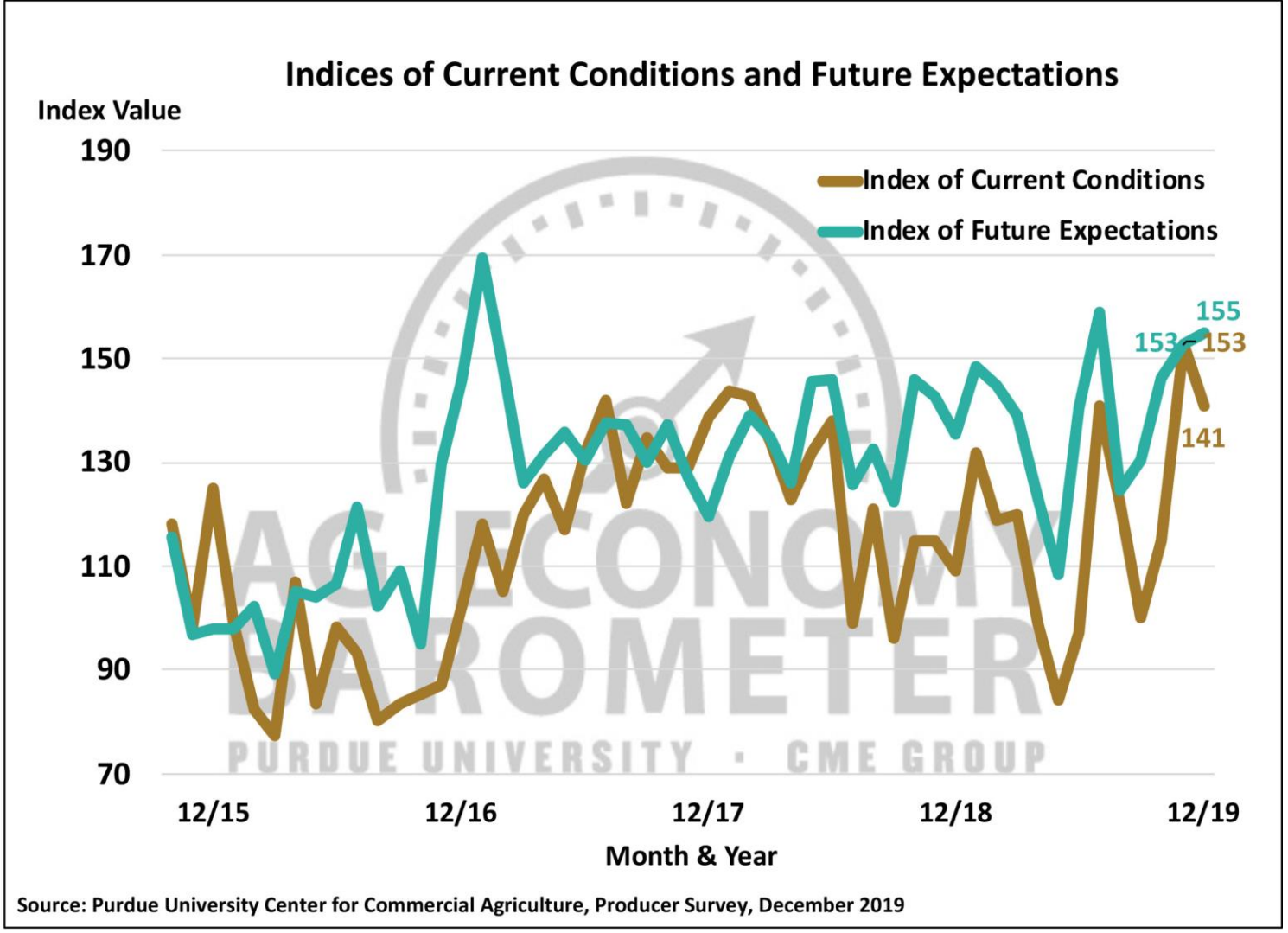
U.S. Phosphate Production

January - September



U.S. DAP f.o.b. Tampa (Domestic)




Indices of Current Conditions and Future Expectations
Index Value
190
170
150
130
110
90
70
Index of Current Conditions
Index of Future Expectations
155
153
153
141
AG ECONOMY BAROMETER
PURDUE UNIVERSITY · CME GROUP
12/15
12/16
12/17
12/18
12/19
Month & Year
Source: Purdue University Center for Commercial Agriculture, Producer Survey, December 2019

U.S. Corn – Balance Sheet

Corn	2017/18	2018/19 Est.	2019/20 Proj. Dec	2019/20 Proj. Jan
Planting Acres	90.2	88.9	89.9	89.7
Yield	176.6	176.4	167	168
Beg. Stocks	2293	2140	2114	2221
+Production	14,609	14,340	15,825	15,962
-Domestic Use	12,361	12,223	12,065	12,295
-Exports	2,438	2,065	1,850	1,775
Ending Stocks	2,140	2,221	1,910	1,892
Avg. Farm Price	3.36	3.61	3.85	3.85

Why Stewardship?

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It’s A Priority

Better crop performance, improved soil health, and cleaner air and water.

What is 4R Nutrient Stewardship?

- **Actively considering all management practices and site specific characteristics when making the right source, right rate, right time, and right place nutrient management decisions**

It's A Priority – Why?

Nutrient Use Efficiency

Sustainability

Climate Smart Ag

Soil Health

Water Quality

Water Pollution

Air Quality

Regulation

Nutrient Loss

Facebook/Twitter

Coca-Cola	Reduce GHG emissions across value chain by 25% by 2020
Unilever	Halve GHG impact of products across the lifecycle by 2020
Walmart Save money. Live better.	Fertilizer optimization on 14 M acres of U.S. farmland by 2020
Kellogg's®	Responsibly source top 10 ingredients & materials by 2020

4R Economics

- Case Studies to showcase ROI
- 6 Complete - 18 Complete by End of Feb.

Partnering in Wisconsin

- **Discovery Farm Program**
- **12 Case Studies – Spring 2020**

4R Advocates

- Brian Herbeck, Deweese, NE
  Bill Nejezchleb, Fairfield Non Stock Coop, Fairfield, NE
- Danny Basham, Madisonville, KY
  Phillip Osborn, Nutrien Ag Solutions, KY
- Dustin Grooms, Plant City, FL
  Jerrod Parker, Chemical Dynamics, INC, FL
- Jonathan Quinn, Warwick, MD
  Kenny Glenn, Southern States Cooperative, INC, DE
- Michael Ganschow, IL
  Malcolm Stambaugh, Growmark FS, IL

- **2020 Advocates – COMING SOON**

Non-irrigated Corn-Soybean – Eastern US

Practice Level	Right Source	Right Rate	Right Time	Right Place
Basic - adopted by approximately 50% of growers	• Guaranteed or book value for all sources applied • Urea, UAN, Anhydrous Ammonia, Manure	• Rate based on evidence recognized by regional soil fertility extension • Properly accounting for legume & Manure N	• Spring; not on frozen soil • Apply manure according to a manure management plan	• Broadcast and incorporated, injected or subsurface band • **If broadcasted Urea accompanied by an inhibitor** • UAN w/herbicide no more than 40 Lbs
Intermediate - adopted by approximately 20% of growers	• Guaranteed or known analysis for all sources applied; **with nitrification inhibitor or controlled release if preplant;** with **urease inhibitor for urea/UAN surface applied sidedress**	• Rate based on evidence recognized by regional soil fertility extension, including results of local adaptive management research. • Manure analysis required to determine rate	• Some or all applied nitrogen in season or if pre-plant used with **NI or polymer coated Urea**	• Broadcast and incorporated, injected or subsurface band, **surface application only for sidedress urea with UI or dribbled UAN**
Advanced - adopted by approximately 5% of growers	• Guaranteed or known analysis; **with nitrification inhibitor or controlled release if preplant; with urease inhibitor for urea/UAN sidedress**	• Rate based on evidence recognized by regional soil fertility extension, or results of **local adaptive management research**, AND, in addition, addressing within-field and weather-specific variability using tools such as crop sensors, PSNT, models that allow adjustment of in-season N rates	• Some or all N applied in-season	• Broadcast and incorporated, injected or subsurface band, **surface application only for sidedress urea with UI or dribbled UAN**

No-till corn, VRT P, K, & seeding based on grid sampling & yield	2014	2015	2016	2017
	Basic	Basic	Intermed.	Advanced
	Corn	Corn	Corn	Corn
	229 bu/ac	220 bu/ac	245 bu/ac	256 bu/ac
Cost Per Acre	$ 325.50	$ 268.40	$ 281.08	$ 240.09
4R cost % of income	25%	26%	30%	27%
4R Cost per Bushel	$ 1.42	$ 1.22	$ 1.15	$ 0.94

On Farm Data – IL Corn

	2014	2015	2016	2017
4R Practice Level	Basic	Basic	Intermediate	Advanced
Corn Grain Yield (bu/ac)	229	220	246	256
N Application Rate (lbs/ac)	253	208	253	204
Nitrogen Use Efficiency (lb N applied/bu corn grain)	1.11	0.95	1.03	0.80
N Balance (lb N applied – lb N harvested)	69.5	31.9	56.6	-1.14
CO2e Emissions per bu	9.4	8.43	8.17	6.14
Percent reduction	-	10.3	13.1	34.7

Future of Fertilizer

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Sustainability

516B

Gallons of water recycled in 2017

#FertilizerReport

2X

The fertilizer industry is twice as safe as our chemical industry peers

#FertilizerReport

7.5M

Metric tons of GHGs captured and reused by the industry — this has tripled since 2013

#FertilizerReport

Factors Impacting Fertilizer

- **IMF Global Economic Growth 3%**
- **Commodities prices are forecast to rise and favor corn plantings**
- **Fertilizer prices declined in 2019**
- **Capacity growth exceeding demand growth.**

Nutrient Outlooks

	N	P	K
Demand	146.8	47.4	44.3
Supply	157.6	50.4	52.1
(million tonnes)			

Thank you!

- www.nutrientstewardship.org
- www.tfi.org

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